

5. BIOLOGICAL RESOURCES

5.1 INTRODUCTION

This section summarizes the biological resources of Ballona Wetlands. A summary of the regulatory framework protecting sensitive biological resources is given in Section 11.

5.2 HABITATS AND VEGETATION

5.2.1 Tidal Marsh Development and Plant Ecology

Coastal saltmarshes can be defined as areas vegetated by herbs, grasses or low shrubs, bordering salt water bodies (Adam, 1990). These areas are periodically inundated with water due to tidal fluctuation and flooding, and occupy the interface between land and sea; therefore, they represent flora and fauna with both marine and terrestrial elements. The organisms essential for the recognition of a saltmarsh are the dominant vascular plants, and the primary abiotic factors that control the distribution of these plants are hydroperiod and soil salinity (HTHA et al., 1982; Josselyn, 1983; Zedler et al., 1992; Zedler et al., 1999; Zedler, 2001). Edaphic factors, such as nutrient and chemical concentrations, and soil mineral and organic matter have a critical role in coastal saltmarsh development, and the role of precipitation and evapotranspiration, anthropogenic changes, such as point and non-point source pollution (i.e. nutrients and sediments), and regional/global climate changes (e.g. drought, temperature, and sea level) all contribute to the structure and ecology in a saltmarsh (Boyer and Zedler, 1999; Kennish, 2001).

5.2.2 Marsh Vegetation Pattern and Development

The relationships and dispersal of plant species in a typical California saltmarsh follow a vertically distributed pattern set up by tidal activity and accumulated sediment. The fluctuation of the mixed semidiurnal tide at Ballona Wetlands, not only on a daily basis, but on a seasonal basis, has a dramatic impact on the saltmarsh vegetation. The timing and duration of tidal inundation and exposure is an important factor in determining which saltmarsh plant species will thrive (Zedler et al., 2001). At Ballona Wetlands, the tides have been modified or excluded from some areas of the wetland by the construction of levees, tide-gates, roads and the Ballona Creek flood control channel.

Tidal activity can generally be broken down into vertical overlapping zones. The lowest level, the subtidal zone is continually covered by water. Above this is the intertidal zone, which is affected by the fluctuating tidal levels. The lowest portion of the intertidal zone consists of unvegetated mudflats. The mid and upper portions of the intertidal zone include vegetated tidal flats or saltmarsh.

The processes of sedimentation and plant colonization and subsequent dynamics lead to establishment of tidal saltmarsh or tidal brackish habitat depending on water column and interstitial soil salinities. The tidal saltmarsh plant community will likely be pickleweed (*Sarcocornia pacifica* syn: *Salicornia virginica*) -

dominated as sedimentation raises the site elevation to form a marsh plain between MHW and MHHW elevations. Cordgrass (*Spartina foliosa*), if present, will only dominate the lowest elevations and along the lower order slough channels that form within the marsh. The slough channels provide narrow, sinuous corridors of intertidal mudflat habitat. The vegetation of the saltmarsh plain might include native species such as salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), spearscale (*Atriplex triangularis*), fleshy jaumea (*Jaumea carnosa*), seaside arrow-grass (*Triglochin concinna*), saltmarsh dodder (*Cuscuta salina*), and saltwort (*Batis maritima*).

The high marsh can be defined as the area from approximately MHHW to extreme high water (Josselyn, 1983). The high marsh zone's flooded wetlands include hypersaline or eurysaline areas within the marsh-upland ecotone. Hypersaline areas have salt concentrations greater than sea water, usually in enclosed bodies of water. Eurysaline areas can have a wide range of salt concentration. Pickleweed and salt grass dominate a varied group of halophytes that occur in this zone, which also include spearscale (*Atriplex triangularis*), saltmarsh dodder, fleshy jaumea, seaside arrowgrass, and alkali heath; and the introduced brass buttons (*Cotula coronopifolia*) and rabbitsfoot grass (*Polypogon monspeliensis*). Plants in this zone must tolerate high salinity, as salt is deposited during intermittent inundation and accumulates during long periods of soil water evaporation.

Historically, the diking of tidal marsh habitats, including Ballona Wetlands, has impacted the high marsh and ecotone, creating a very sharp boundary between the tidal marsh and upland (Josselyn, 1983). This can cause a substantial decline in species diversity because the halophytic marsh zone and adjacent upland transition zone often have a higher diversity of plants than the lower marsh vegetation zones.

A brackish marsh habitat will be dominated by tule or bulrush species (*Schoenoplectus* spp. and *Bolboschoenus* spp. syn: *Scirpus* spp.); these species will occur on the tidal marsh plain between MHW and MHHW elevations only where there is substantial and persistent inflow of freshwater. Common pickleweed will be abundant in the brackish marsh - saltmarsh transition.

Above the intertidal zone is the terrestrial or upland zone. The terrestrial zone is not tidally influenced, but receives moist winds from the ocean that regulate daily temperatures. Habitats within this zone typically include coastal dunes, grasslands and coastal scrub.

5.2.3 Ballona Wetlands Tidal Marsh

Within Ballona Wetlands, the lower portions of the intertidal zone are submerged by salt water twice daily. Elsewhere in Southern California, this zone is typically dominated by cordgrass, but this species is lacking at Ballona. The intermediate margins of the intertidal zone are covered by the higher tides, but not every day. These areas are subject to prolonged periods of exposure, usually not more than 15 days. In this zone, the common pickleweed is usually dominant. The lower and intermediate areas of the intertidal zone are well represented in the Ballona Wetlands, but with reduced species diversity (Hendrickson, 1991a).

The upper portions of the intertidal zone extend above the MHW mark to the extreme high water level in the marsh. This zone is occasionally inundated by salt water and excludes many species that are intolerant of salt water. This portion of the saltmarsh can undergo long periods of drying and the surface of the soil may become highly saline. Although Ballona Wetlands has many of the species common to this zone, such as shoregrass (*Monanthochloe littoralis*), salt grass, Parish's glasswort (*Arthrocnemum subterminale* syn: *Salicornia subterminails*) and pickleweed, the species distributions differ from other saltmarshes in Southern California. The modified vegetation is most likely due to the affects of restrictions to tidal flushing as well as changes in the freshwater inundation levels (Hendrickson, 1991b).

5.2.4 Historical Species Composition of Ballona Wetlands

The floral compendium in Appendix B-1 includes all wetland and upland vascular plants species published, reported, noted, listed, observed, or collected within the delineated boundaries of Ballona Wetlands (Areas A, B, C), Del Rey Lagoon, Ballona Lagoon, Marina Del Rey, Grand Canal, Ballona Creek, and the Oxford Basin. The sources of information regarding these plants include, but are not necessarily limited to, the following: Altschul and Homburg (1992), Reed (2002), MEC Analytical Systems (2001), Clark (1979), Hendrickson (1991a), Zedler (1982), Clark et al. (1979), Drennan (2004), and Ferren (personal communication). Many of the plants listed the compendium are not documented with one or more voucher specimens deposited in a recognized herbarium. Therefore, until voucher specimens are provided, these undocumented entities are preliminary identifications.

The intent of this compendium is to list each entity, preferably under one name, and generally following the nomenclature and taxonomy provided in the Jepson Manual (Hickman, 1993), except where recent taxonomic changes have been published in the botanical literature. These names may not be those names applied in the above mentioned sources for a variety of reasons including application of older names, use of different taxonomic treatments resulting in lumping or splitting of named entities, and presumed misidentifications. The ideal floral compendium, a goal of ongoing efforts, is to document all recently observed entities with voucher specimens and to cite as many herbarium specimens as feasible for all plants known for the Ballona Wetlands area including those presumably extirpated sometime in the past. Preparation of a separate list for those species anticipated to occur, or to have occurred at one time, but now extirpated within the ecosystem, is possible only once a more thorough investigation is completed. The known extirpated species, as well as the presumed extirpated native species, are potential candidates for reintroduction or introduction into the Ballona Wetlands region as part of the ongoing efforts to restore the habitats.

Since the floral compendium is compiled from primarily historic sources and un-documented accounts, and habitat conditions continue to change on-site (e.g. tide-gate modifications, invasive species spread and proliferation, habitat restoration), there remains a potentially significant data gap with respect to on-site habitats. For the purposes of developing the conceptual restoration plan, the combination of these sources could be utilized to develop a comprehensive vegetation map. However, mapping inconsistencies and gaps would have to be covered through development of a generalized unifying classification.

Recognizing these gaps, the CDFG has retained the services of Dr. Todd Keeler-Wolf to help prepare a new detailed vegetation map for Ballona Wetlands using the California Native Plant Society (CNPS) classification system as described in the *Manual of California Vegetation* (Sawyer and Keeler-Wolf, 1995). It has been adopted as the standard vegetation classification by state and federal agencies such as CDFG, the U.S. Forest Service (USFS), National Park Service, and U.S. Geological Survey. This mapping effort will be a later supplement to this report.

5.3 HABITAT CLASSIFICATION

Habitats of the Ballona area can be divided into two major categories: upland and wetland. These are distinguished by hydrology, soil, and/or vegetation characteristics, which depend in part on how the boundary between the two categories is distinguished. This section provides a general guide to the classification of the types once a boundary has been established between uplands and wetlands.

5.3.1 Uplands

The great majority of the upland habitats that remain have been altered or they were created by filling or grading. These uplands may or may not be characterized by upland vegetation. Examples of the major types of upland habitats include the following:

- **Natural Upland Habitats:**
 - Dunes
 - Bluffs
 - Alluvial Fans and Deltas
- **Created Habitats:**
 - Berms and Dikes
 - Fields
 - Spoils
 - Roads, Roadsides, and Parking Areas
 - Revetment, Rubble
 - Trails

These natural and created habitats may be colonized by native and/or exotic species but the vegetation structure regardless of origin generally includes the following habitat types:

5.3.1.1 Herbaceous Types

These habitat types are dominated by annual and perennial herbaceous species. These types include dune herbs where the dominant cover during the spring will be from native and non-native annual wildflowers such as sun cups (*Camissonia* spp.), popcorn flowers (*Cryptantha* spp.), lotus (*Lotus* spp.), plantains (*Plantago* spp.) and California croton (*Croton californica*). Also included in these types are grasslands, which in the

Ballona Wetlands region are dominated by non-native grasses like wild oats (*Avena* spp.), bromes (*Bromus* spp.), barleys (*Hordeum* spp.), and ryegrass (*Lolium* spp.), along with some native species (e.g. *Nasella cernua*). These types are common in disturbed areas.

5.3.1.2 Scrub/Shrub Types

These habitat types are usually dominated by perennial shrub and sub-shrub species, even during the spring season. These types include dune scrub where the dune system is stable enough to support the dune shrub species like beach bur (*Ambrosia chamissonis*), sand verbena (*Abronia unbellata*), dune buckwheat (*Eriogonum parviflorum*), salt bush species (*Atriplex* spp.), and coastal bush lupine (*Lupinus chamissonis*). Another shrub type is the coastal bluff scrub which is dominated by species tolerant of a constant exposure to salt spray such as dudleya species (*Dudleya* spp.), sand aster (*Lessingia filaginifolia*), and goldenbush species (*Ericameria* spp.).

In addition to the dune and bluff scrub, there is a disturbed coastal sage scrub on the central fill areas of the wetland. The vegetation that is on top of the historical fill area is primarily non-native, but patches of remnant and/or recovering sage scrub are present. This disturbed coastal sage scrub habitat has scattered coyote bush (*Baccharis pilularis*) and California sagebrush (*Artemisia californica*) shrubs with a few laurel sumacs (*Malosma laurina*).

These habitat types also include areas of non-native scrub vegetation such as castor bean (*Ricinis communis*), pampass grass (*Cortaderia selloana*), Brazilian peppertree (*Schinus terebinthifolius*), ngaio tree (*Myoporum laetum*), and wattle or acacia (*Acacia* spp.), as well as cultivated vegetation.

5.3.1.3 Forested/Woodland Types

These types include woodland areas, groves, stands, and rows of tree species, native and non-native. In the Ballona Wetlands area, the native examples of these habitat types (e.g. riparian woodland) are no longer present or greatly reduced due to habitat loss, but small stands of non-native trees are present such as eucalyptus (*Eucalyptus* spp.), pepper trees (*Schinus* spp.), date and fan palms (*Phoenix* spp. and *Washintonia* spp.), sweet-gum (*Liquidambar styraciflua*), and olive trees (*Olea europea*).

5.3.2 Wetlands

Wetlands are classified according to the U.S. Fish and Wildlife Service (USFWS) system developed by Cowardin et al. (1979) and expanded upon by Ferren et al. (1995). The major systems, sub-systems, and classes include the following:

5.3.2.1 Marine

Marine systems include the open-ocean and coastlines. Within this system are the sub-systems of subtidal and intertidal and within these sub-systems are the classes Unconsolidated Bottom (sub-classes sand and

mud), Unconsolidated Shore (sub-classes sand and mud), and Aquatic Bed (sub-classes algal, rooted vascular, and floating vascular).

5.3.2.2 *Estuarine*

Estuarine systems include deep water tidal habitats and adjacent tidal wetlands that have a high salinity. As with the marine system, this system includes the sub-systems of subtidal and intertidal and within these sub-systems are the classes Unconsolidated Bottom (sub-classes sand and mud), Unconsolidated Shore (sub-classes sand and mud), Aquatic Bed (sub-classes algal, rooted vascular, and floating vascular), Emergent (sub-classes persistent and non-persistent), Scrub-shrub Wetland (sub-classes broad-leaved deciduous and broad-leaved evergreen), and Forested Wetland (sub-class broad-leaved deciduous).

5.3.2.3 *Riverine*

Riverine systems include all deep water habitats and wetlands contained within a channel with low salinity and low to moderate vegetation. This system includes the sub-systems of lower perennial and intermittent and within these sub-systems are the classes Unconsolidated Bottom (sub-classes sand and mud), Unconsolidated Shore (sub-classes sand, mud, and vegetated), Aquatic Bed (sub-classes algal, rooted vascular, and floating vascular), and Emergent (sub-class non-persistent).

5.3.2.4 *Palustrine*

Palustrine systems include small (<20 acres), vegetated, shallow (<6.6 feet), and non-saline wetlands. This system does not have any sub-systems, but has at least five classes known from Ballona Wetlands, including Unconsolidated Bottom (sub-classes sand and mud), Unconsolidated Shore (sub-classes sand, mud, and vegetated), Aquatic Bed (sub-classes algal, rooted vascular, and floating vascular), Emergent (sub-classes persistent and non-persistent), Scrub-shrub Wetland (sub-classes broad-leaved deciduous and broad-leaved evergreen), and Forested Wetland (sub-class broad-leaved deciduous).

Various hydrogeomorphic units can be added to the classification to establish landform context, such as flats, berms, channels, ditches, banks, slopes, shores, etc.

5.3.3 Specific Vegetation and Habitat Resources

Specific vegetation and associated habitat types were evaluated as part of the development of the Ballona Wetlands vegetation compendium (Appendix B-1). The compendium relies primarily on historic sources and reports habitat type for each species listed. Generally, habitat resources within Ballona Wetlands fall into the following broader plant community types which will be further detailed in future vegetation mapping efforts.

5.3.3.1 Saltmarsh

Vegetation of saltmarsh communities (estuarine and palustrine types) consists of halophytic (salt-tolerant) plants that are mostly low-growing herbaceous perennials. In general terms for Ballona Wetlands, this includes all portions of the project area where pickleweed is a major or dominant species. Other common saltmarsh species (e.g. salt grass, alkali heath, etc.) may or may not be present. Within this community type, sub-categories can be broken out for degree (full tidal or muted tidal) or lack of tidal influence, salt flat areas, and marsh-like areas resulting from depressed basins associated with soil settlement. Saltmarsh vegetation can be observed in Areas A, B, and C in some form or another, though most of the saltmarsh habitat in Areas A and C is non-tidal.

5.3.3.2 Freshwater Marsh

Freshwater marshes (palustrine emergent wetlands) occur in nutrient-rich mineral soil that is saturated through most or all of the year. The dominant plants of freshwater marsh communities are mostly perennial monocots that can reproduce vegetatively by underground rhizomes. At Ballona Wetlands, these areas are dominated by freshwater emergent monocots such as cattails (*Typha* spp.) and bulrushes. Within the project area, freshwater marsh is primarily limited to the created Freshwater Marsh at the southeastern end of Area B, and stands of cattails and bulrushes along a remnant riparian drainage running across the southern boundary of Area B. Included within this vegetation type are areas that could be considered willow scrub, that are dominated by ‘thickets’ of willows such as arroyo willow (*Salix lasiolepis*), narrow-leaved willow (*Salix exigua*) and red willow (*Salix laevigata*). Willow scrub typically occurs in riparian corridors near freshwater sources. Within the project area, it notably occurs in Area B below the Del Rey Bluffs and at the western end of Area B adjacent to the dunes. Willow scrub species were also planted in association with the Freshwater Marsh in Area B, and can be found as isolated patches elsewhere.

5.3.3.3 Coastal Sage

The coastal sage scrub communities of Southern California occur on a variety of substrates, generally in soils with moisture available in the upper horizons only during the winter-spring growing season. Plants of the coastal sage scrub are adapted to these conditions, and are a mixture of herbaceous, suffrutescent, and shrubby species. In general terms for Ballona Wetlands, coastal sage scrub includes all upland or transitional habitat areas where coastal sage scrub plant species are dominant. Such species include California sagebrush (*Artemisia californica*), coyote brush (*Baccharis pilularis*), laurel sumac (*Malosma laurina*) and others.

5.3.3.4 Dune Scrub

In general the dune scrub type habitat in Southern California is a mixture of pioneer dune habitat along the coastal strand with dune scrub plants located inland from the pioneer dune community. At Ballona Wetlands, the sandy areas are a remnant of the dune system that pre-exist the surrounding residential development, and are a mixture of pioneer and scrub-dominated dune habitat. Notable species of this plant community include dune lupine (*Lupinus chamissonis*), sand verbena (*Abronia* sp.), coast buckwheat (*Eriogonum*

parvifolium), deerweed (*Lotus scoparius* var. *scoparius*) and branching phacelia (*Phacelia ramosissima*). Coastal dune habitat occurs primarily in the western end of Area B. However, a similar sandy area occurs in the southeastern end of Area A.

5.3.3.5 Annual Grassland

Annual grassland communities are assemblages of plants that thrive in disturbed areas, roadsides, and similar sites in developed areas. Dominant species include annual grasses (ryegrass – *Lolium multiflorum*, etc.), pampas grass (*Cortaderia* sp.), bristly ox-tongue (*Picris echioides*), ice plants (*Mesembryanthemum* spp. and *Carpobrotus* spp.) and others. Such areas occur throughout the project area, but tend to be less common in areas with wetland hydrology.

5.3.4 Special-Status Plants

Numerous studies, investigations and surveys have occurred within Ballona Wetlands and the surrounding area. This section discusses special-status plant species discussed in the preceding sections and the following:

- State and Federally Listed Endangered, Threatened and Rare Plants of California, CDFG, Natural Heritage Division, July 2006 (CDFG, 2006). Available at: <http://www.dfg.ca.gov/whdab/pdfs/TEPlants.pdf>;
- California Natural Diversity Data Base (CNDDB, 2006). Available at: <http://www.dfg.ca.gov/whdab/html/cnddb.html>; and
- California Native Plant Society (CNPS, 2006) (7th Edition). Available at: <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>

According to a 2006 query of the CNDDB, 13 special-status plant species (all CNPS List 1B with one 1A species) potentially occur within a three-mile radius of the Ballona Wetlands area. Of these, 6 species are believed to be extant including the Parish's brittlescale (*Atriplex parishii*), southern tarplant (*Centromadia parryi* ssp. *australis*), Orcutt's pincushion (*Chaenactis glabrata* var. *fernandina*), mud nama (*Nama stenocarpum*), Brand's phacelia (*Phacelia stelleris*), and salt marsh checkerbloom (*Sidalcea neomexicana*). According to CNDDB, a total of 7 species are considered extirpated from the area, including the Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*), coastal dunes milk-vetch (*Astragalus tener* var. *titi*), beach spectaclepod (*Dithyrea maritima*), San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), salt marsh bird's beak (*Cordylanthus maritimus* ssp. *maritimus*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), and Ballona cinquefoil (*Potentilla multijuga*).

The CNPS inventory, queried by topographic quad, lists 11 special-status plant species (CNPS List 1A, 1B and one 3), including the Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*), southern tarplant (*Centromadia parryi* ssp. *australis*), San Fernando Valley spineflower (*Chorizanthe parryi* var.

fernandina), beach spectaclepod (*Dithyrea maritima*), many-stemmed dudleya (*Dudleya multicaulis*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), Brand's phacelia (*Phacelia stelleris*), Ballona cinquefoil (*Potentilla multijuga*), Lewis's evening-primrose (*Camissonia lewisii*), Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), and Prostrate navarretia (*Navarretia prostrata*).

A number of species are listed in both CNNDDB and CNPS inventory; however these databases present some conflicting information. Two species, Ventura marsh milk-vetch and San Fernando Valley spineflower, are described within CNDDDB as extirpated while within the CNPS inventory lists them as recently rediscovered in 1997 and 1999, respectively.

The Psomas study (1995) revealed two other CNPS List 3 and 4 special-status plants known to occur in the project area including the Lewis's evening primrose (*Camissonia lewisii*) and suffrutescent wallflower (*Erysimum insulare* ssp. *suffrutescens*). Both of these species are known to occur in Areas B and C. Lewis's evening primrose occurs in sandy areas, generally away from dense grasses and weeds. Its population is estimated as 5,000 individuals in Area B and 6,000 individuals in Area C. Suffrutescent wallflower occurs in dune habitats at the western end of Area B and its population is estimated at 10 individuals.

This same study confirmed occurrences of the southern tarplant as occurring along the margins of marshes and in grasslands and areas supporting vernal pools. Approximately 30 individuals have been estimated to occur east of the ball fields in Area C (Psomas, 1995). In addition, wooly seablite (*Suaeda taxifolia*) is known to occur on site and is a CNPS List 4 species (plants of limited distribution) (Hendrickson, 1991b; Reed, 2002; Ferren, 2006).

While numerous studies have occurred in the Ballona Wetlands region, many special-status plant species may have occurred within the area but were not inventoried or collected and their historic presence will never be known. For instance, the Los Angeles sunflower (*Helianthus nuttallii* ssp. *parishii*) is believed to have occupied the Ballona Wetlands region historically, however, this species is presumed to be extirpated from the area (Mason, 1957; CNPS, 2006).

5.4 JURISDICTIONAL WETLANDS

A few jurisdictional wetland determinations have been made, particularly for Areas A and B. In 1989, the Los Angeles District of the USACE determined that 'waters of the U.S.' totaled 9.83 acres in Area A, 170.56 acres in Area B, and 1.80 acres in Area C. In a later study of Area A, jurisdictional wetlands using the California Coastal Act definition of wetlands (Entrix, 1992) were found to total 22.49 acres. As this example illustrates, the extent of wetlands present within a given area depends on the jurisdictional definition considered. For many years, the CDFG delineation completed in the 1980's has been the basis for some California Coastal Commission permitting decisions for Ballona Wetlands, although a number of recent delineations disagree with previous delineations. No recent delineation report covering the entire project site addressing all wetland regulatory agencies has been completed, and hence the extent of jurisdictional wetlands is not fully known.

For the purposes of conceptual restoration planning, a number of assumptions could be made combining prior wetland delineation results with current vegetation mapping to come up with a reasonable ‘snap shot’ of jurisdictional wetlands within the project area. For future phases, following conceptual restoration design planning, including environmental review under the California Environmental Quality Act (CEQA) and project permitting prior to implementation, a new wetland delineation will be required in consultation with the appropriate regulatory agencies.

5.5 WILDLIFE RESOURCES

5.5.1 Invertebrates

The Ballona Wetlands are an important site for coastal saltmarsh insects due to the rarity of this type of habitat in Southern California. However, information regarding historical invertebrates in Ballona Wetlands is limited (Table 5-1). As of 1981 there had never been a complete survey of the insect fauna of a pristine coastal locality in Southern California (Nagano et al., 1981). In 1981, when Nagano and colleagues produced their insect and terrestrial arthropod report, they noted that it was unusual for insects to be included in an ecological conditions report. A previous Ballona study referenced insects primarily as a food source for higher invertebrates, although it did note the presence of wandering skipper (*Panoquina errans*), an insect then under consideration for Threatened Species status (Nagano et al., 1981). Although there are few studies of invertebrates in the region, it can be assumed that in the 20th century, populations of native species declined along with nearly all coastal wildlife. No new surveys were performed in conjunction with this report; therefore an exact snapshot of the current invertebrate population at Ballona cannot be determined.

Table 5-1. Terrestrial Invertebrate Surveys

Year	Author	Geographic Extent	Description
2000	Psomas	Area B	Survey for El Segundo blue butterfly for Playa Capital
1996	Hawks Biological Consulting	Areas A, B, and C	Sensitive insect survey for Impact Sciences
1991	Mattoni	Area B	Terrestrial arthropod survey for Playa Vista EIR
1991	Boland and Zedler	Area B	Fish and invertebrate research sponsored by the National Audubon Society
1981	Nagano et al.	Areas A and B	Baseline report on insects and related terrestrial arthropods for <i>Biota of the Ballona Region</i> report

Throughout the 2.5-month sensitive-species terrestrial invertebrate survey in 1996 (Hawks Biological Consulting, 1996), 16 orders were collected from Areas A, B, and C, including Collembola (springtails), Thysanura (silverfish), Microcoryphia (bristletails), Odonata (dragonflies and damselflies), Orthoptera (grasshoppers, mantids, roaches, etc.), Dermaptera (earwigs), Isoptera (termites), Psocoptera (psocids and lice), Thysanoptera (thrips), Hemiptera (true bugs), Homoptera (cicadas, hoppers, aphids, etc.), Neuroptera

(lacewings, antlions, etc.), Coleoptera (beetles), Lepidoptera (butterflies and moths), Diptera (flies), and Hymenoptera (bees, wasps, and ants). Four sensitive species were found: wandering skipper, western mudflat tiger beetle (*Cicindela trifasciata sigmoidea*), globose dune beetle (*Coleus globosus*), and Dorothy's dune weevil (*Trigonoscuta dorothea dorothea*). In addition, some new species were found: Jerusalem cricket (*Stenopelmatus* new species) and sand roach (*Arenivaga* new species). Western mudflat tiger beetle, Jerusalem cricket, and sand roach were each also reported by Nagano et al. (1981) and by Mattoni (1991). Nagano et al. (1981) also listed two other tiger beetles, neither of which were found in later surveys (Hawks Biological Consulting, 1996).

Benthic invertebrates have been sampled in Area B several times between 1981 and 2004 (Table 5-2). Data regarding Areas A and C is more limited. The tidally-influenced portions of Marina Ditch in Area A were sampled in 1995 and 1999. Area C has never been sampled for benthic invertebrates due to a lack of tidal influence. Many benthic invertebrates are sessile, so water quality parameters such as temperature and salinity are important determinants of the invertebrate species that colonize a habitat (Zedler, 2001).

Table 5-2. Benthic Invertebrate Surveys

Year	Author	Geographic Extent	Description
2004	MEC-Weston	Area B	Vegetation, fish, bird, and benthic infauna study, provided monitoring data for USACE 1135
2001	MEC-Weston	Area B	Vegetation, fish, bird, and benthic infauna study, provided monitoring data for USACE 1135
2003	Wetlands Research Associates	Area B	Benthic infauna survey
2001	Glen Lukos Associates	Areas A, B, and C	Habitat assessment for Riverside and San Diego Fairy Shrimp for Playa Capital
1999	Chambers Group	Areas A and B	Benthic infauna survey for Impact Sciences
1996	Chambers Group	Areas A and B	Benthic infauna survey for Impact Sciences
1991	Carter	Areas A, B, and C	Non-insect invertebrate survey for Playa Vista EIR
1991	Boland and Zedler	Area B	Fish and invertebrate research sponsored by the National Audubon Society.
1981	Ramirez	Area B	Mollusk survey for <i>Biota of the Ballona Region</i> report

5.5.1.1 Area A

Terrestrial Invertebrates

Sensitive-species surveys performed in 1995 collected the western mudflat tiger beetle (*Cicindela trifasciata sigmoidea*) from Area A (Hawks Biological Consulting, 1996). Although not specifically recognized as a sensitive species, the western mudflat tiger beetle is considered to be sensitive due to its restricted distribution in declining Southern California coastal habitats (Hawks Biological Consulting, 1996). Carter (1991) reported that Area A yielded almost no non-insect terrestrial invertebrates except for the African land snail (*Otala lactea*).

Benthic Infauna

The only benthic invertebrate habitat in Area A is Marina Ditch. It was sampled for benthic invertebrates in 1995 and 1998 by Chambers Group (1996, 1999). In 1998 the estuarine polychaete worm (*Polydora nuchalis*) accounted for 80% of the animals collected in the ditch (Chambers Group, 1999). Only five taxa were collected. Other species included *Streblospio benedicti*, *Capitella capitata*, Oligochaete, and *Corophium acherusicum*. Results from the 1998 sampling showed less diversity compared to the results from 1995, which showed three species to be abundant, the estuarine polychaete worm and two cosmopolitan amphipod crustaceans (*Corophium indidiosum* and *Grandidierella japonica*). Total number of taxa in 1995 was eleven, twice as many as in 1998.

5.5.1.2 Area B

Terrestrial Invertebrates

Surveys performed in 1995 collected some species considered to be sensitive due to their restricted distribution in declining Southern California coastal habitats: the western mudflat tiger beetle (*Cicindela trifasciata sigmoidea*), two undescribed species of Jerusalem cricket (*Stenopelmatus* new species), and one undescribed species of sand roach (*Arenivage* new species) (Hawks Biological Consulting, 1996). Each of these was also found in previous studies by Mattoni (1991) and Nagano et al. (1981).

Benthic Infauna

The most recent surveys of benthic infaunal invertebrates in the channels of Area B were performed by MEC-Weston (2005), and by Wetlands Research Associates (WRA, 2004). These surveys provide information on channel invertebrate populations after the installation of self-regulating tide-gates by the Ballona Wetlands 1135 Restoration Project (USACE, 2000). The new tide-gates became operational in March 2003.

MEC-Weston (2005) sampled benthic invertebrates at eight stations in August 2003. Late summer is the time of maximum diversity and abundance of estuarine benthic fauna. These populations tend to be affected negatively by winter rains (Onuf, 1987). The survey identified 37 taxa, a slight decrease from the 43 taxa identified in core samples taken in August 2001 (MEC-Weston, 2005). Annelid worms were represented by the most taxa (12), followed by mollusks with nine taxa, and arthropods with seven taxa. Minor phyla collected in 2003 included cnidaria and nemertea. At their entire sample sites WRA (2004) found a greater total number of invertebrates in September 2003 than in February 2003. However, the greatest increases in number of invertebrates were at the sampling locations closest to the channel, thus the change was not believed to be only seasonal. In the July 1998 study of Chambers Group (1999) a total of 21 taxa were identified, one less than in August 1995 (Chambers Group, 1996). Carter found 35 taxa in Area B during her 1990-1991 survey.

The amphipod *Monocorophium insidiosum* was abundant at all stations in 2003. The tube building amphipod *Grandidierella japonica* was the dominant species at one station. The polychaete *Polydora nuchalis* was the most abundant taxa at one station and was found at three others. *Grandidierella* and the gastropod *Acteocina inculta* were the most abundant species at a station.

The total number of taxa per station ranged from a low of seven taxa to a high of 21 in 2003. In general, the stations farthest from the tide-gates had fewer taxa than stations closer to the tide-gates. This pattern is similar to that observed before the 2001 restoration.

Clams were collected in cores at two stations in both 2001 and 2003. During the 2003 sampling, two little neck clams (*Protothaca* sp.) and one jackknife clam (*Tagelus affinis*) were collected in Area B. Although no clams were collected in long cores, four California chione clams (*Chione californiensis*) were collected in regular cores. This pattern in clam distribution is the same as was observed in 2001 before the restoration. Therefore, increased tidal flow does not appear to have resulted in a greater distribution of clams throughout the wetlands.

5.5.1.3 Area C

Terrestrial Invertebrates

No formal arthropod surveys have been conducted on Area C.

Benthic Infauna

Area C has not been sampled for benthic invertebrate fauna on the basis that it contains no tidal channels or other appropriate habitat for non-insect invertebrates. However, Marina Ditch does run through Area C and this does have a tidal connection to Marina Del Rey. One non-insect invertebrate was collected in Area C in 1991, the invasive African land snail (*Otata lactea*) (Carter, 1991).

5.5.1.4 Special-Status Species

Terrestrial Invertebrates

The restored wetlands in Area B are expected to be used by sensitive insects including the El Segundo blue butterfly (*Euphilotes battoides alluni*), wandering skipper, Belkin's dune tabanid fly (*Brennania belkini*), Dorothy's sand dune weevil (*Trigonoscutea dorothea*), the western mudflat tiger beetle, and the sandy beach tiger beetle (*Cicindela hirticollis grvida*) (Tsihrintzis et al., 1996).

According to a November 2005 download from the CNDDDB, six special-status species of terrestrial invertebrates and one special-status species of gastropod may be present in Ballona Wetlands. Two butterflies are listed, the wandering skipper and the monarch (*Danaus plexippus* — which uses the project area as a wintering site, according the CNDDDB). The other five species listed are Belkin's dune tabanid fly, Dorothy's El Segunda dune weevil, the globose dune beetle (*Coelus globosus*), and Lange's El Segundo dune weevil (*Onychobaris langei*). The brackish water snail (*Tryonia imitator*) is the sole gastropod listed. Additionally, Psomas (2001) evaluated Areas A, B, and C in 2000 for four additional federal endangered species, two species of fairy shrimp and two butterflies.

Wandering skipper is currently designated as a Lower Risk/near threatened (LR/nt) species on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened

Species. Psomas and Lockhart (2001) reported that wandering skipper were present in Areas A and B. They were also found in Areas A and B during surveys in 1995, 1991, and 1981 (Hawks Biological Consulting, 1996; Mattoni, 1991; Nagano, 1981).

An estimated 1,000 individual monarch butterflies were observed roosting in Area B in December 1997 (CNDDB, 2005). This species was also reported by Nagano et al (1981) and Mattoni (1991). They were the most commonly seen of all insects, although populations varied, with at least 500 in mid-October 1990 until the end of February 1991, and a maximum of 5,000 in January 1991 (Mattoni, 1991). Their distribution was highly non-random due to a roosting site in a eucalyptus grove in Area B (Mattoni, 1991). The monarch butterfly is on the IUCN Red List of Threatened Species. Along with eucalyptus trees supporting wintering habitat, the Ballona Wetlands also supports narrowleaf milkweed (*Asclepias fascicularis*), which is used as a larval host plant in Area C (B. Henderson, CDFG, PC).

Belkin's dune tabanid fly is also listed as a vulnerable species on the IUCN Red List of Threatened Species, and has not been found in the Ballona Wetlands region since the 1980's (Hawks Biological Consulting, 1996). Mattoni (1991) noted that the fly had been present in the mid-1980's but was 'recently' extirpated.

Dorothy's El Segundo dune weevil is listed on both the USFWS Federal Species of Concern and the CNDDB Special Animals list, with no particular designation. It was found in Area B in 1995 and more recently in the dune system immediately west of Area B (Hawks Biological Consulting, 1996; Psomas and Lockhart, 2001). It was the 15th most common insect collected by pitfall traps in 1991 and one of the most abundant weevils on the dunes (Mattoni, 1991).

The globose dune beetle is listed as a USFWS Species of Concern, although the CNDDB no longer uses this USFWS designation because it was not maintained on a state-wide basis. It is also designated as Vulnerable on the IUCN Red List of Threatened Species. This species has been found in recent surveys, in Area B in 1995, and more recently in the dune system immediately west of Area B (Hawks Biological Consulting, 1996; Psomas and Lockhart, 2001). It also occurs at the Los Angeles Airport dunes (Mattoni, 1991). Nagano et al.(1981) searched for the beetle but noted that it had never been recorded from the Ballona Wetlands region, although it was known at the time to occur at nearby Dockweiler State Beach. Mattoni (1991) noted that this species had never been found in the Ballona Wetlands region, but if it were to occur anywhere, it would occur in the sand dunes.

Lange's El Segundo dune weevil is listed on both the USFWS Federal Species of Concern and the CNDDB Special Animals list, with no particular designation. This species was found in recent surveys to inhabit the dune system immediately west of Area B (Psomas and Lockhart, 2001). It was also collected by Nagano et al. 1981 and Mattoni (1991).

The brackish water snail (*Tryonia imitator*) has Data Deficient (DD) status on the IUCN Red List of Threatened Species and is also a USFWS Federal Species of Concern. This snail has not been observed in the project area since the 1970's (CNDDB). The brackish water snail was not reported from the Playa Vista development area during recent surveys (Psomas and Lockhart, 2001).

Two species of endangered fairy shrimp, Riverside fairy shrimp (*Streptocephalus woottoni*) and San Diego fairy shrimp (*Branchinecta sandiegonensis*), which reside in vernal pools, were evaluated in the Ballona Wetlands region over one week in early May 2000 (GLA, 2000). The nearest occurrence of habitat occupied by adult Riverside fairy shrimp is in Ventura County, 34 miles northwest of Ballona Wetlands, although viable cysts were identified just a few miles away at Los Angeles Airport. The nearest occurrence of habitat of San Diego fairy shrimp is in Fairview Park, about 40 miles southeast of the Ballona Wetlands region (GLA, 2000). A non-listed species of fairy shrimp, *B. lindahli* is known to occur at Madrona Marsh in Torrance, a city in Los Angeles County, and there are plans to try to establish Riverside fairy shrimp there as mitigation for the LAX population (D. Christopher Rogers, personal communication).

Areas A, B, and C were evaluated for habitat suitable for both the Riverside and the San Diego fairy shrimp, although the habitat assessment did not include either wet- or dry-season sampling (GLA, 2000). Wherever substantial ponding was observed during the May 2000 assessments, the water was measured for specific conductance and visual observations of any aquatic invertebrates and vegetation were collected. No ponds in Areas A, B, or C were determined to be capable of supporting either type of fairy shrimp due to high salinities or inadequate length or depth of ponding, and thus, both the Riverside fairy shrimp and the San Diego fairy shrimp were determined to be absent from the project area (Psomas, 2001; Psomas and Lockhart, 2001). Subsequently, fairy shrimp were identified adjacent to the Ballona Wetlands and further studies are being undertaken by CDFG (Brad Henderson, personal communication). In order to rule-out endangered fairy shrimp populations in the Ballona Wetlands region, both wet- and dry-season surveys would need to be performed in order to follow the proper protocols (D. Christopher Rogers, personal communication).

Surveys in 2000 also determined that two endangered butterflies, El Segundo blue butterfly, and Quino checkerspot butterfly (*Euphydryas editha quino*) were absent from the project area (Psomas, 2001, Psomas and Lockhart, 2001). Nagano et al. (1981) searched extensively for El Segundo blue butterfly, but had no success in capturing or observing a specimen. The El Segundo blue has a population at the Los Angeles Airport just a few miles away, but has not been recorded in the Ballona Wetlands region since the mid-1980's when one male was sighted at Playa Del Rey (Mattoni, 1991). This is likely to be a reaction to the decline of its host plant *Eriogonum parvifolium* in the area, which had lost about 65% of its population between the mid 1980's and 1991 (Mattoni, 1991). However, this plant is still found in Area B and has been extensively planted by the Friends of Ballona Wetlands in the dunes that border the western edge of Area B. The assessment of the Quino checkerspot butterfly was based on frequent visits to the area as well as current information on species range (Psomas and Lockhart, 2001). It was not found on-site by any of the 1981, 1991, or 1996 surveys.

Benthic Infauna

No special-status benthic invertebrates are known to inhabit the project area, nor are any known to have in the past.

5.5.2 Fish

Swift and Franz (1981) conducted the first detailed study of the Ballona Wetlands fish community. This was the first ever study of an upper marsh fish community in Southern California and serves as a baseline for future marshes, as well as providing a wealth of information about likely conditions in the past. Prior to modifications of the region, when the Los Angeles River emptied into the Ballona Wetlands during flood events, the fish assemblage would have included all the species known to have inhabited the River. Most of these species are currently absent from the project area and have been since the 1950's (Swift et al., 1993). The course of the Los Angeles River has been maintained to the south and away from Ballona Creek since 1884.

Since the first detailed study of the Ballona Wetlands fish community by Swift and Franz (1981), eight other fish assemblage studies of the tidal marsh within Area B and/or Ballona Creek have been undertaken (Table 5-3). Fish surveys of Marina Del Rey are also included, due to the high potential for recruitment from the harbor.

Table 5-3. Fish Surveys

Year	Author	Geographic Extent	Description
2004	MEC-Weston	Area B	Vegetation, fish, and bird study, provided monitoring data for USACE 1135
2003	MEC-Weston	Area B	Vegetation, fish, birds, and benthic infauna study, provided monitoring data for USACE 1135
2001	MEC-Weston	Area B	Vegetation, fish, birds, and benthic infauna study, provided monitoring data for USACE 1135
1996	Haglund et al.	Area B Ballona Creek Marina Del Rey	Fish survey performed for Impact Sciences
1993	Swift et al.	Southern California	Journal article. 'The status and distribution of the freshwater fishes of Southern California'. Bulletin of the Southern California Academy of Sciences
1991	Soltz	Area B	Fish survey for Playa Vista EIR
1991	Allen	Ballona Creek Low Marina Del Rey	Fish survey for Playa Vista EIR
1991	Boland and Zedler	Area B	Fish and invertebrate research sponsored by the National Audubon Society.
1981	Swift and Frantz	Area B	Fish survey for <i>Biota of the Ballona Region</i> report

No new surveys were performed in conjunction with this report; therefore an exact snapshot of the current fish population at Ballona cannot be determined. If the species has been reported as present during a survey, the area in which it was found and the author and year of the report is listed. Species which have been

specifically surveyed and never found are listed as NA, as are species which are believed to have occurred historically but which have never been documented.

The surveys listed in Table 5-3 described 55 species of fish that inhabit or have been known to inhabit Area B, Ballona Creek, and/or Marina Del Rey (Appendix B-2). Eleven of these species were believed to have historically inhabited the Ballona Wetlands area but were not found in any survey from the past 25 years. Under more natural conditions, species including bay pipefish (*Syngnathus leptorhynchus*), barred pipefish (*Syngnathus auliscus*), starry flounder (*Platichthys stellatus*), and tidewater goby (*Eucyclogobius newberri*), should occur (Swift and Frantz, 1981; C. Swift, personal communication). Starry flounder is very rare in estuaries south of Point Conception (C. Swift, personal communication). When the Los Angeles River emptied into the marsh during flood events in historical times, additional species would also have included steelhead trout (*Oncorhynchus mykiss*), unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), Santa Ana sucker (*Castostomus santaanae*), arroyo chub (*Gila orcutti*), Santa Ana speckled dace (*Rhinichthys osculus*), Pacific lamprey (*Lampetra tridentate*), and western brook lamprey (*Lampetra richardsoni*) (Swift et al., 1993).

Taken together, the studies listed in Table 5-3 list a total of 44 species found in Area B, Ballona Creek, and Marina Del Rey in the past 25 years (Appendix B-2). Eight species were common to all three areas. Three species were reported to have been found in Area B and either Ballona Creek or Marina Del Rey, and five species were found only in Area B. The remaining 28 species were found only in Ballona Creek, Marina Del Rey, or both. Of these, nine were unique to Ballona Creek and nine to Marina Del Rey. The remaining 10 species were found in both the Creek and Marina Del Rey.

Species found in all three areas include arrow goby (*Clevelandia ios*), California halibut (*Paralichthys californicus*), cheekspot goby (*Ilypnus gilberti*), diamond turbot (*Hypsopsetta guttulata*), queenfish (*Seriphys politus*), shadow goby (*Quietula y-cauda*), shiner perch (*Cymatogaster aggregate*), and topsmelt (*Atherinops affinis*). Longjaw mudsucker (*Gillichthys mirabilis*) was found in Area B and in Ballona Creek. Pacific staghorn sculpin (*Leptocottus armatus*) and yellowfin goby (*Acanthogobius flavimanus*) were each found in Area B and Marina Del Rey.

Species found only within Area B included California killifish (*Fundulus parvipinnis*), mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), black perch (*Embiotoca jacksoni*), and striped mullet (*Mugil cephalus*). Black perch is a coastal marine species and its occurrence in only Area B can only be interpreted as an unlikely event (C. Swift, personal communication). Striped mullet were also often seen in Ballona Creek in the 1990's and probably also exist there today (C. Swift, personal communication).

Species in both Ballona Creek and Marina Del Rey included barred sea bass (*Paralabrax nebulifer*), bat ray (*Myliobaris californica*), jacksmelt (*Atherinopsis californiensis*), kelp bass (*Paralabrax clathratus*), mussel blenny (*Hypsoblennius jenkinsi*), Pacific sardine (*Sardinops sagax*), spotted kelpfish (*Gibbonsia elegans*), spotted turbot (*Pleuronichthys ritteri*), white croaker (*Genyonemus lineatus*), and white seabass (*Atractoscion nobilis*).

California corbina (*Menticirrhus undulatus*), California needlefish (*Strongylura exilis*), fantail sole (*Xystreurus liolepis*), horneyhead turbot (*Pleuronichthys verticalis*), opaleye (*Girella nigricans*), sargo (*Anisotremus davidsoni*), white surfperch (*Phanerodon furcatus*), yellowfin croaker (*Umbrina roncadore*), and zebra perch (*Hermosilla azurea*) were reported exclusively from Ballona Creek.

Species exclusively found in Marina Del Rey included California clingfish (*Gobiesox rhessodon*), California tonguefish (*Symphurus atricauda*), giant kelpfish (*Heterostichus rostratus*), Northern anchovy (*Engraulis mordax*), Pacific barracuda (*Sphyræna argentea*), round stingray (*Urolophus halleri*), salema (*Xenistius californiensis*), specklefin midshipman (*Porichthys myriaster*), and spotted sand bass (*Paralabrax maculatofasciatus*).

5.5.2.1 Ballona Creek and Marina Del Rey Harbor

Ballona Creek and Marina Del Rey were sampled in 1991 by otter trawl tows. Samples were collected in July and October 1990 and in January 1991. Samples were also collected from Marina Del Rey in April 1991. Ballona Creek was not sampled in April due to an upstream oil spill.

During 1991 sampling of Ballona Creek, 594 individual fish of 13 species were collected, of which nearly 83% were cheekspot goby. Next highest in abundance was California halibut with nearly 7%. Barred sand bass and arrow goby each made up about 2.5% of the catch, followed by post-larval goby, kelp bass, topsmelt, diamond turbot, spotted turbot, hornyhead turbot, and Pacific sardine. One kelp fish, one mussel blenny, and one California needlefish were also captured. The highest numbers of fish (364) were caught in July, while only 11 fish were caught in January (Allen, 1991). This sampling was considered depauperate compared to Marina Del Rey (Allen, 1991).

The fish species found to inhabit lower Marina Del Rey during the 1991 sampling event were characteristic of harbor habitats throughout Southern California (Allen, 1991). Collection methods included otter trawl, gill net, minnow trap, visual surveys, and minnow seine, and 5469 fish representative of 22 species were collected. Northern anchovy and queenfish were the most abundant species, each representing about 43% of the total catch. White croaker comprised nearly 6% of the total, cheekspot goby 3.5%, and California halibut about 1%. The remaining species each represented less than 1% of the total, and included, in descending order of abundance: barred sand bass, arrow goby, California tonguefish, yellowfin goby, diamond turbot, giant kelpfish, Pacific staghorn sculpin, mussel blenny, kelp bass, spotted turbot, white sea bass, bat ray, Pacific barracuda, shiner perch, California clingfish, round stingray, and salema.

Ballona Creek and Marina Del Rey were also sampled using various methods by Haglund et al.(1996) between December 10, 1995 and January 31, 1996. Otter trawl tows, minnow traps, and gill nets were used at each site, and in addition, Ballona Creek was surveyed visually by snorkeling.

In the 1996 results for Ballona Creek, nine of the species that were collected in 1991 were found again: arrow goby, barred sand bass, California halibut, California needlefish, cheekspot goby, diamond turbot, mussel blenny, spotted turbot, and topsmelt. The 1996 collection effort also yielded 13 species not captured in 1991,

including California corbina, jacksmelt, longjaw mudsucker, opaleye, queenfish, sargo, shadow goby, shiner perch, spotted kelpfish, white croaker, white seabass, yellowfin croaker, and zebra perch. The larger number of species collected in 1996 may have been due to the addition of nocturnal sampling, which was not performed in the 1991 survey (Haglund et al., 1996).

In 1996, Marina Del Rey yielded 20 species: bat ray, Pacific sardine, Northern anchovy, specklefin midshipman, topsmelt, jacksmelt, spotted sand bass, barred sand bass, salema, white sea bass, white croaker, queenfish, shiner perch, Pacific barracuda, arrow goby, cheekspot goby, shadow goby, California halibut, spotted turbot, and California tonguefish (Haglund et al., 1996). Of these, six species (Pacific sardine, specklefin midshipman, topsmelt, jacksmelt, spotted sand bass, and shadow goby) had not been captured in 1991. Eight species caught in 1991 were not caught in 1996; yellowfin goby, diamond turbot, giant kelpfish, Pacific staghorn sculpin, mussel blenny, kelp bass, California clingfish, and round stingray.

5.5.2.2 *Area A*

No formal studies of fish populations in Area A are known to have been undertaken, although Marina Ditch receives tidal flow via a culvert from Marina Del Rey. According to Soltz (1991), Area A does not contain sufficient water to support fish, although there are reports that Marina Ditch is used by striped mullet and round stingray (van de Hoek, personal communication). Several people have seen and photographed round stingray in Area A.

5.5.2.3 *Area B*

A total of 16 species of fish have been found in Area B over the past 25 years (Appendix C-2). Several of these species (black perch, California halibut, and queenfish) were collected in 1981 and have not been recorded since then. Swift and Frantz (1981) collected three or four species from the upstream or southeastern half of Area B southeast of Culver Boulevard during their sampling. When Haglund et al. (1996) attempted to repeat sampling at these upstream stations, water was lacking at some stations and sampling could not be conducted (C. Swift, personal communication). Four species were collected in 1981 and in later surveys, but not in the three most recent rounds of sampling. These species are shadow goby, shiner perch, striped mullet, and yellowfin goby (an introduced species). Spotted turbot has been collected in only two sampling events in the past 25 years, by Allen (1991) and Haglund et al. (1996).

Most of the species that have not been collected in Area B in recent years still occur in Ballona Creek and Marina Del Rey, and thus can probably still be found on occasion within Area B. Some species have never been reported outside Area B, including California killifish, mosquitofish, sailfin molly, black perch, and striped mullet. Of these, only mosquitofish and sailfin molly, both non-indigenous introduced species, are likely to be restricted to the marsh by habitat type (C. Swift, personal communication). Neither black perch nor striped mullet have been reported from surveys of Ballona Creek or Marina Del Rey, although anecdotal evidence suggests that striped mullet do currently inhabit Ballona Creek.

The fish species assemblage in Area B is likely to be composed of the nine species that have been collected consistently between the first survey in 1981 and the most recent surveys in the 2000's. These include arrow goby, California killifish, cheekspot goby, longjaw mudsucker, mosquitofish, and sailfin molly, which spend most of their life cycle in brackish water; and topsmelt, diamond turbot, and Pacific staghorn sculpin, which use the marsh as breeding grounds or nurseries. Each of these, with the exception of cheekspot goby (which was found in 2001 and 2003), were found in the most recent sampling event in 2004.

The channels within Area B were sampled in July of 2004 to provide data on fish populations using the wetlands after implementation of the USACE 1135 project, which was a restoration of the tide-gates to increase tidal flushing of Area B. Prior to the tide-gate restoration project, baseline conditions were documented in 2001 (MEC-Weston, 2001). The same methods used during the 2001 baseline study were implemented during four seasonal post-restoration surveys in 2003 (MEC-Weston, 2004). The July 2004 was intended to provide further information on the development of fish populations under post-restoration conditions.

Fish were sampled at eight stations in Ballona Wetlands on July 15, 2004. The stations were located as close as practicable to the sampling stations established during the 2001 baseline study and the 2003 post-restoration study previously used by MEC-Weston (2001, 2004). The 2004 survey was scheduled to coincide with neap tidal conditions in order to avoid extremes in water depth and current velocity. Fish were collected using a standard beach seine. Two replicate hauls, spaced approximately 10 yards apart, were taken at each station.

A total of 1,766 fish representing eight species were collected during the July 2004 survey. Topsmelt was the most abundant species collected at all stations combined, with 1,023 individuals. Both adult and juvenile topsmelt were collected at every station except one. California killifish was second in abundance, with 325 individuals collected, and was present at all stations. Adult to juvenile size killifish were collected throughout the wetland. Longjaw mudsucker was third in abundance with 187 individuals collected, and was present at all stations. Arrow goby was present in moderately high numbers, with 141 total individuals. One diamond turbot and one Pacific staghorn sculpin were each caught. The mean total abundance per station ranged from 34 individual fish per haul to 200 fish per haul. Mean wet weight biomass per station ranged from 79 g of fish per haul to 802 g of fish per haul.

The fish species assemblage found in 2004 was similar to that of the surveys conducted in 2001 and 2003, before and after the tide-gate restoration, which may indicate that there is little recruitment of fish from Ballona Creek into Ballona Wetlands (MEC-Weston, 2004). There were no fish species collected in 2004 that were not collected in 2003. The July 2004 total abundance (1,766 individuals) was within the range of the June (565 individuals) and August surveys (3,055 individuals) of 2003.

5.5.2.4 *Area C*

Although not documented, it is reported that Marina Ditch in Area C supports California killifish and mosquitofish (e.g. R. van de Hoek, personal communication).

5.5.2.5 *Special-Status Species*

According to a November 2005 download from the CNDDDB, no special-status species of fish are known to inhabit the Ballona Wetlands region. This is confirmed by the fish surveys performed in Area B by MEC-Weston (2001, 2003, 2004). No known survey in the last 25 years has ever collected an individual of a special-status species.

Under more natural conditions, federally endangered tidewater goby should occur in Area B (Swift and Frantz, 1981). The recently published USFWS *Recovery Plan for the Tidewater Goby* includes Ballona Creek as a potential introduction site within a list of 160 locations where tidewater goby either occurs, occurred historically, has unverified occurrence records, or is not known to occur but could potentially be introduced. If chosen, the Ballona Creek recovery sub-unit would be a potential introduction site, as there are no records of historic tidewater goby use in the area. The recovery plan estimates that 2.0 to 5.0 acres of potential tidewater goby habitat are available but also notes that Ballona Creek is designated as 'Water Quality Limited' by the State Water Resources Control Board and that restoration would be beneficial prior to introduction. The threats to introduction listed for Ballona Creek include municipal runoff, possible vehicular or railroad contamination, sewage treatment effluent, oil contamination/oil fields in the vicinity of habitat, encroaching development, stream channelization, water diversions/groundwater pumping, salinity regime affected, reduction or modification of habitat, native predators, and exotic fish species (USFWS, 2005).

If the Los Angeles River still emptied into the Ballona Wetlands, additional species would potentially include two federally endangered species, steelhead trout and unarmored threespine stickleback; the federally threatened Santa Ana sucker; and two California species of concern, arroyo chub and Santa Ana speckled dace. The course of the Los Angeles River has been maintained to the south and away from Ballona Creek since 1884 (Section 3). The 1985 recovery plan for unarmored threespine stickleback (USFWS, 1985) recommended re-introduction into the Los Angeles Basin, which may include Ballona Wetlands (C. Swift, personal communication).

Although none of these special-status species are known to inhabit the area, evaluations of special-status species were performed by Psomas (2001) and Psomas and Lockhart, 2001 for the Playa Capital Company, LLC. All areas of the Playa Vista development area were specifically evaluated for steelhead trout, tidewater goby, and arroyo chub. The steelhead trout requires clear, cold water in higher elevation headwaters of coastal streams in order to spawn (Psomas and Lockhart, 2001). Each life stage of the tidewater goby takes place in upper lagoons of shallow coastal streams where salinities are below 10 ppt (Psomas and Lockhart, 2001). The arroyo chub inhabits slow-moving or backwater sections of warm to cool streams with mud or sand substrates, which do not occur in either the Centinella Ditch or the Freshwater Marsh area (Psomas, 2001). Therefore, each of these species was found to be absent from the project area and have no potential of occurrence at the site due to the lack of suitable habitat and the absence of the species during past surveys of the area (Psomas, 2001; Psomas and Lockhart, 2001).

In addition, Area C and portions of Area B designated for Freshwater Marsh restoration and residential development were evaluated for the unarmored threespine stickleback and for Santa Ana sucker. There is no historic record of occurrence of the threespine stickleback nor is there suitable habitat in the region at this time. The Santa Ana sucker has been historically recorded from the Los Angeles River, and thus probably in or near the Ballona Wetlands region, since the river once emptied nearby (Swift et al 1993). No area of the Ballona Wetlands region contains suitable habitat for the Santa Ana sucker today. Both of these species were determined to be absent from the project area and have no likelihood of occurrence (Psomas, 2001).

5.5.3 Reptiles and Amphibians

The ecology of the Ballona Wetlands region has been considerably modified since the turn of the century (Hayes and Guyer, 1981). Twenty five years ago, only a portion of Ballona's original herpetofauna was believed to remain. Amphibian populations may have been affected by habitat alteration and pollution of freshwater habitats required for reproduction, while reptile populations have probably been affected by habitat encroachment by exotic vegetation (Hayes and Guyer, 1981). Some species of reptiles may benefit from physical changes in the region, such as the increase in area above tidal influx and the increase in cover-providing debris. For example, the access roads to the oil and gas wells in Areas A and B are believed to have created habitat for four species of reptiles (southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), common kingsnake (*Lampropeltis getulus*), and gopher snake (*Pituophis melanoleucus*)), which would otherwise be absent from marsh areas (Hayes and Guyer, 1981).

Many species are believed to have inhabited the historical freshwater marsh system, but have never been observed in a published survey (Table 5-4). These species include the southwestern pond turtle (*Clemmys marmorata pallida*), California red-legged frog (*Rana aurora draytoni*), common garter snake (*Thamnophis sirtalis*), red sided garter snake (*Thamnophis sirtalis parietalis*), and two-striped garter snake (*Thamnophis couchi hammondi*) (C. Swift, personal communication; Psomas 2001; Hayes and Guyer, 1981). Reptiles believed to have historically inhabited the drier areas of the Ballona Wetlands area include the red racer (*Masticophis flagellum*), yellow-bellied racer (*Coluber constrictor*), Pacific rattlesnake, (*Crotalus viridis*), and the coast horned lizard (*Phrynosoma coronatum*) (Hayes and Guyer, 1981).

Table 5-4. Reptile and Amphibian Surveys

Year	Author	Geographic Extent	Description
1996	Impact Sciences, Inc.	Areas A, B, and C	Amphibian and reptile survey
1991	Hovore	Areas A, B, and C	Amphibian, reptile, and mammal survey for Playa Vista EIR
1981	Hayes and Guyer	Areas A and B	Herpetofauna survey for <i>Biota of the Ballona Region</i> report

Three surveys are described here (Tables 5-6 and Appendix B-3). No new surveys were performed in conjunction with this report; therefore an exact snapshot of the current reptile and amphibian populations at Ballona cannot be determined. If the species has been reported as present during a survey, the area in which it

was found and the author and year of the report is listed. Species which have been specifically surveyed and never found are listed as NA, as are species which are believed to have occurred historically but which have never been documented.

Hayes and Guyer (1981) summarized information on nine species of amphibians and reptiles: four lizards, two snakes, a frog, a toad, and a salamander (Appendix B-3). It also consolidated what little was previously known about reptiles and amphibians in Areas A and B. Species reported in the 1981 survey include: Silvery legless lizard (*Anniella pulchra pulchra*—a sub-species of the California legless lizard and a California Special Concern species), southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), common kingsnake (*Lampropeltis getulus*), gopher snake (*Pituophis melanoleucus*), Pacific treefrog (*Pseudacris regilla*), Pacific slender salamander (*Batrachoseps pacificus*), and the California toad (*Bufo boreas halophilus*). The California toad was formerly known as western toad (*Bufo boreas*) until the western toad was sub-divided into the Boreal toad (*Bufo boreas boreas*) and the California toad (Jennings, 2004). The species along the coast and Ballona Wetlands is the California toad (C. Swift, personal communication).

The most recent surveys of the project area for reptiles and amphibians were by Impact Sciences (1996), and by Hovore (1991) (Appendix B-3). Native species found during both of these surveys included common kingsnake, gopher snake, side-blotched lizard, southern alligator lizard, and western fence lizard. Pacific treefrog and California toad were found in 1996. Pacific slender salamander and silvery legless lizard were reported in 1991. Silvery legless lizards have been reported to occur commonly by restoration volunteers on the dunes in Area B, with the most recent sighting occurring in March 2006 (K. Rose, personal communication). No invasive species of amphibians or reptiles have been reported in the project area.

5.5.3.1 Area A

Amphibians

Impact Sciences (1996) reported Pacific treefrog and California toad in Area A. These species were also found in 1981 (Hayes and Guyer, 1981). California toad was also reported by Hovore (1991), along with one other amphibian species, Pacific slender salamander. Pacific slender salamander was found in low numbers in the early 1980's and 1990's, with the size ranges found in 1991 indicating successful on-site breeding due to the presence of both juvenile and adult stages (Hovore, 1991). The 1991 study determined that the abundance of frogs and toads in general were reduced compared to the 1981 study, again likely due to drought conditions in 1991. Although no published surveys have been performed during peak conditions in normal rainfall conditions, the site is typically teeming with toads and frogs in season.

Reptiles

Four reptile species were found in Area A during the Hovore (1991) study; western fence lizard, side-blotch lizard, California kingsnake and gopher snake. During the Impact Sciences (1996) survey, 20 western fence lizards and one southern alligator lizard were captured in 190 pitfall trapnights. Southern alligator lizard, western fence lizard, common kingsnake, and gopher snake were also found in 1981 (Hayes and Guyer, 1981).

5.5.3.2 Area B

Amphibians

California toad and Pacific treefrogs were found in Area B by Hayes and Guyer (1981). No evidence of amphibians was found during the 1991 surveys, most likely due to the drought conditions of the winter of 1990-1991 and a massive discharge of street runoff into the Centinela Ditch in the fall of 1990, which flushed Area B with freshwater of dubious water quality. In 1996, low numbers of Pacific treefrogs and California toad were observed in Area B (Impact Sciences, 1996). It is likely that typical conditions in Area B more closely align with earlier observations, which reported that Pacific treefrogs were found wherever slow moving or standing freshwater occurred (Hayes and Guyer, 1981). Although the 1981 study observed only one California toad (Hayes and Guyer, 1981), it was noted that the low numbers were surprising and that more were expected.

In normal to high rainfall years, breeding Pacific treefrogs and California toads are commonly observed in freshwater pools throughout Area B (Brad Henderson, personal communication). In 2005, Area B had several centers of treefrog breeding with large numbers of larvae, metamorphs and adults, as well as one large California toad pool with hundreds of metamorphs.

Reptiles

During the Impact Science (1996) survey, 32 western fence lizards, one southern alligator lizard, and 47 side-blotched lizards were captured in the 390 pitfall trapnights conducted in Area B. In addition, four southern alligator lizards, 11 side-blotched lizards, two common kingsnakes, and two gopher snakes were observed on the project area. All these species were observed in earlier studies, and generally in greater numbers (Hayes and Guyer, 1981). In addition, the 1981 and 1991 studies also captured California legless lizard. This species has also been observed in the dunes by restoration volunteers and was last seen on March 10th, 2006 by Kelly Rose, the Program Director for Friends of Ballona Wetlands (K. Rose, personal communication).

5.5.3.3 Area C

During the Impact Sciences (1996) survey, eight western fence lizards and one southern alligator lizard were captured in 100 pitfall trapnights conducted in Area C, and one western fence lizard was found during a small mammal trapping event. No snakes or amphibians were found during sampling in 1991 (Hovore, 1991). Hayes and Guyer (1981) did not include Area C.

5.5.3.4 Special-Status Species

Evaluations of special-status species were performed by Psomas (2001) for the Playa Capital Company, LLC, although, according to a November 2005 download from the CNDDB, no special-status species of amphibians or reptiles are known to currently inhabit the Ballona Wetlands region. Special-status species were evaluated in two phases. Phase One included Area C as well as the portions of Area B designated for

Freshwater Marsh creation and residential development. Phase Two was composed of Area A and the portion of Area B designated for the restoration project. Three amphibians and four reptiles were evaluated.

Amphibians

The federally endangered arroyo toad (*Bufo microscaphus californicus*) and the federally threatened California red-legged frog (*Rana aurora draytonii*), were evaluated in Phase One. Both species were found to be absent from the project area (Psomas, 2001). These species were also not found in the surveys by Hayes and Guyer (1981), Hovore (1991), or Impact Sciences (1996) and suitable habitat to support these species does not exist. A third amphibian, the western spadefoot toad (*Scaphiopus hammondi*), was evaluated in Phase Two and was also determined to be absent from the area, although there are western spadefoot toad in the Los Angeles Airport dunes, one to two miles away. Hayes and Guyer (1981) did not find the western spadefoot, but suggested that the toad may have been missed in their study due to limited rainfall. Neither Hovore (1991) nor Impact Sciences (1996) reported finding any western spadefoot toad in their studies, and it is believed that there is limited potential habitat for the species.

Reptiles

Four special-status species of reptiles were evaluated in Phase Two: San Diego coastal horned lizard (*Phrynosoma coronatum blainvillei*), western pond turtle (*Clemmys marmorata*), silvery legless lizard (*Anniella pulchra pulchra*), and South Coast garter snake (*Thamnophis sirtalis ssp.*). None of the four species were detected in the project area, although the silvery legless lizard and the South Coast garter snake were declared to have a low potential to be present within the project area (Psomas and Lockhart, 2001). Only the silvery legless lizard has been observed in the Ballona Wetlands in previous studies or since the survey was reported. It is likely that the South Coast garter snake inhabited the original freshwater marsh system (C. Swift, personal communication).

The silvery legless lizard was last recorded in a survey in 1991 in Area B near Hasting's Canyon but is sighted somewhat commonly by restoration volunteers in the dunes. This species is also known to inhabit the LAX dunes just a few miles away. The most recent sighting in Area B occurred March 10th 2006 by Kelly Rose, the Program Director for Friends of Ballona Wetlands (K. Rose, personal communication). It was captured during sampling in Area B in 1981, but not in 1996, possibly because of the difficulties detecting the species using the methods employed by the survey (pit-fall traps and visual encounter surveys).

The San Diego coastal horned lizard also has some limited potential to occur in Area B, as one of its key habitat elements is sandy soils and it is known to occur at LAX. However, it also prefers an abundance of native ant species and the region is dominated by the Argentine ant. The native red *Pogonomyrmex* ant is still common on the dunes and elsewhere in sandy soils.

Other reptile species which would most likely have inhabited the original freshwater marsh system, but which have never been observed in a published survey include two California Special Concern Species: southwestern pond turtle (*Clemmys marmorata pallida*) and two-striped garter snake (*Thamnophis couchi hammondi*) (C. Swift, personal communication).

5.5.4 Mammals

In 1871 the Ballona Wetlands region was described as ‘teeming with native wildlife’ - but it has suffered the same decline in native populations and increases in introduced species as most areas in Southern California (Friesen et al., 1981). About 32 species lived in the vicinity of Ballona Wetlands, including marsupials, insectivores, bats, lagomorphs, rodents, carnivores, and artiodactyls. It is likely that many of the current and former resident species in the nearby San Gabriel Valley and Los Angeles Basin, such as deer, antelope, grizzly bears, wolves, and wildcats, also once foraged in the Ballona Wetlands area (Friesen et al., 1981). However, urbanization has since isolated coastal marshes, reducing species range.

Table 5-5. Mammal Surveys

Year	Author	Geographic Extent	Description
2000	Erickson	Area B	Survey for sensitive species of small mammal for Playa Capital Co.
1996	Impact Sciences	Areas A, B, and C	Mammal survey
1991	Hovore	Areas A, B, and C	Amphibian, reptile, and mammal survey for Playa Vista EIR
1981	Friesen et al.	Area A and B	Mammal survey for <i>Biota of the Ballona Region</i> report

Four surveys are described here (Tables 5-5 and Appendix B-4). No new surveys were performed in conjunction with this report; therefore an exact snapshot of the current wildlife population at Ballona cannot be determined. If the species has been reported as present during a survey, the area in which it was found and the author and year of the report is listed. Species which have been specifically surveyed and never found are listed as NA, as are species which are believed to have occurred historically but which have never been documented.

Native species of mammals found included western harvest mouse (*Reithrodontomys megalotis*), pocket gopher (*Thomomys bottae*), desert cottontail (*Sylvilagus audubonii*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor psora*), California ground squirrel (*Spermophilus beecheyi*), and the sensitive species South Coast marsh vole (*Microtus californicus stephensi*). Invasive species found included house mouse (*Mus musculus*), black rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), domestic cat (*Felis cattus*), Virginia opossum (*Didelphis virginiana*), domestic dog (*Canis familiaris*), and red fox (*Vulpes vulpes*). Native coyote (*Canis latrans*) and invasive fox squirrel (*Sciurus niger*) have also been documented recently, although in 1981 it was deemed likely that coyote no longer occurred on-site (Friesen et al., 1981). The study of Hovore (1991) found low populations of small mammals likely to be the direct result of depredation by red foxes, and that fox were an immediate threat to the continued viability of the Ballona ecosystem. Most species found in the Friesen et al. (1981) study have also been found in later studies.

Eight species of bats are known to have occurred in the area, as evidenced by voucher specimens from the Natural History Museum of Los Angeles County and the San Diego Museum of Natural History (Friesen et

al., 1981). No bats were sighted or taken during surveys in 1981, which utilized traplines, Sherman live traps, Museum Special traps, and extensive observations. At the time of the survey, bats were rarely seen within the Los Angeles Basin except for areas near mountains (Friesen et al., 1981). There are no documented records of bat occurrence within the Ballona area, although specialized bat surveys were performed in 1996 by Impact Sciences. This survey included examination of potential bat roost sites for guano, staining, and other indications of bats, as well as use of a hand-held bat detector. No evidence of bats in Areas A, B, or C was uncovered, although a high frequency echo-location was picked up in an adjacent area (Impact Sciences, 1996).

It has also been speculated that at some point in the past, the edges of the marsh may have been used by marine mammals (Friesen et al., 1981). Several species of cetaceans have been observed to occasionally come ashore for short periods or stand along the beaches adjacent to the wetlands (Friesen et al., 1981).

5.5.4.1 Area A

Area A was last evaluated for mammal species by Impact Sciences (1996). Native species encountered included western harvest mouse, pocket gopher, desert cottontail, and striped skunk. The Area A survey used a variety of methods, including 469 effective Sherman live-trapping nights, 190 effective pitfall trapping nights, two nights of scent station monitoring, two nights of spotlight monitoring, and two nights of track station monitoring. The live-traps captured 78 small mammals of both native and non-native species, native species captured consisted of three animals total, two western harvest mouse and one pocket gopher. No native species were caught by pitfall trapping. One scent station in Area A was operated for two nights and attracted desert cottontail and striped skunk in addition to non-native species. The spotlight and tracking stations each recorded one native species, desert cottontail. Non-native species found in Area A include house mouse, black rat, Norway rat, Virginia opossum, domestic dog, and red fox. Two special-status species, San Diego black-tailed jackrabbit and South Coast marsh vole have been known to occur in Area A.

5.5.4.2 Area B

Area B was evaluated for sensitive species of small mammals in October 2000. During this sampling event, four non-sensitive species, two native and two non-native species, were found in the 1,860 Sherman live-traps set over six nights (Psomas, 2001). The two native species found were California ground squirrel (one recovered) and western harvest mouse (nine recovered). The presence of pocket gopher was also noted, meaning the species was seen, heard, or identified by the presence of tracks, scat, or other signs.

Area B was also evaluated for mammal species by Impact Sciences (1996). The survey used a variety of methods, including 2,486 effective Sherman live-trapping nights, 490 effective pitfall trapping nights, six effective nights of scent station monitoring, two nights of spotlight monitoring, and two nights of track station monitoring. The live-traps captured 229 small mammals of both native and non-native species, including 41 native harvest mouse, and 14 native South Coast marsh vole (*Microtus californicus stephensi*), which is a special-status species. Other native species found included one pocket gopher captured in a pitfall trap and

desert cottontail, which were observed at two of the three scent stations, during one night of spotlight monitoring, and at one track station.

Hovore (1991) found that small mammal population densities appeared to be much lower in 1991 than in 1981. In general, the species found in 1981 were the same as those found in later surveys, with a few additions in later years, such as red fox.

Non-native species found in Area B include house mouse, black rat, Norway rat, domestic cat, Virginia opossum, domestic dog, and red fox. Special-status species that have been known to inhabit Area B include San Diego black-tailed jackrabbit, South Coast marsh vole and saltmarsh shrew.

5.5.4.3 Area C

Area C was last evaluated for mammal species by Impact Sciences (1996). The survey used a variety of methods and included 250 effective Sherman live-trapping nights, 100 effective pitfall trapping nights, two nights of scent station monitoring, two nights of spotlight surveys, and two nights of track station monitoring. No native species were found in any of the live-traps or pitfall traps, although native species including striped skunk and desert cottontail were observed during the spotlight survey. Desert cottontail was also observed during both track station nights. Western harvest mouse was noted to occur in Area C by Hovore (1991).

Non-native species found in Area C include house mouse and domestic cats and dogs. No special-status species have ever been documented within Area C.

5.5.4.4 Special-Status Species

Several special-status species of mammal are known to occur within the Ballona Wetlands region. According to a November 2005 download from the CNDDDB, three special-status species of mammals have been known to inhabit Areas A and B. These include the South Coast marsh vole (*Microtus californicus stephensi*), Pacific pocket mouse (*Perognathus longimembris pacificus*), and Southern California saltmarsh shrew (*Sorex ornatus salicornicus*). The saltmarsh shrew is also listed in Area C. The most recent sensitive-species surveys of the Area were Impact Sciences (1996) and Psomas and Lockhart (2001).

The San Diego black-tailed jackrabbit, currently a California Special Concern Species, was found to have a low potential for occurrence (Psomas and Lockhart, 2001) due to its population at Los Angeles Airport and its presence in Area D¹; in the early 1990's. It was not found by Impact Sciences (1996) survey, but was observed in Areas A and B in 1981 (Friesen et al., 1981). Friesen et al. (1981) reported interviewing hunters who frequently visited Area A on Saturday nights in order to drink beer and shoot rabbits, which may have been a factor in their population decline. Hawks, owls, and gopher snakes are also known predators of the black-tailed jackrabbit.

¹ Area D, located east of Lincoln Boulevard, was considered part of the Ballona Wetlands until the late 1990's, when a residential development project was constructed there. Thus, Area D is not currently part of the Ballona Wetlands evaluated for the Conceptual Restoration Plan.

Three species of bat, all Federal Species of Concern at the time, were also evaluated for potential occurrence. The long-eared myotis (*Myotis evotis*) and the pale big-eared bat (*Corynorhinus townsendii pallescens*) are no longer federally listed but are California Special Concern Species. The Yuma myotis bat (*Myotis yumanensis*) is currently a Bureau of Land Management Sensitive Species. None were detected within the project area in 2000 or 1981, although no specialized survey methods were used to determine presence or absence (Psomas and Lockhart, 2001; Friesen et al., 1981). Other sensitive-species of bat that may have occurred historically include California Special Concern species California leaf-nosed bat (*Macrotus californicus californicus*), pallid bat (*Antrozous pallidus pacificus*), and western mastiff bat (*Eumops perotis californicus*) (Friesen et al., 1981). A bat survey was performed by Impact Sciences in 1996 which included examination of potential bat roost sites for guano, staining, and other indications of bats, as well as use of a hand-held bat detector. No evidence of bats in Areas A, B, or C was uncovered, although a high frequency echo-location was picked up in an adjacent area (Impact Sciences, 1996).

The South Coast marsh vole, currently a California Special Concern species, has been found in Area B in each of the three most recent sampling events. The species was observed in 2000, 1996, 1991, and 1981. During Impact Sciences (1996) trapping efforts, 14 individuals were captured. The study of Hovore (1991) recovered two individual South Coast marsh voles, one each in Areas A and B. Three specimens were captured in salt grass areas within Area B in 1981.

The last recorded observance of the saltmarsh shrew, a California Special Concern species, was in Area B by Hovore (1991). The saltmarsh shrew was also found in Area B by Friesen et al. (1981). No Southern California saltmarsh shrews were captured during Impact Sciences (1996) trapping efforts. Psomas (2001) evaluated the entire project area for Southern California saltmarsh shrew and determined that the species had a low potential for occurrence, as it had not been observed within the past 10 years.

The federally endangered Pacific pocket mouse has not been observed or captured in the project area since 1938 (CNDDB). None were recovered or observed during Impact Sciences (1996) trapping efforts or by Friesen et al. (1981). In 2000, Area C and portions of Area B designated for Freshwater Marsh restoration and residential development were evaluated and the pocket mouse was found to be absent (Psomas and Lockhart, 2001).

5.5.5 Birds

Prior to human modifications, when Ballona Wetlands consisted of a large coastal saltmarsh system, the area probably supported a bird species composition typical of relatively undisturbed coastal wetlands in Southern California. Birds at Ballona Wetlands probably included a variety of shorebirds including plovers and sandpipers, wading birds including herons and egrets, fish foragers including pelicans and terns; waterfowl including dabbling ducks (feeding in shallow water), diving ducks (feeding in deeper water), loons, grebes, and cormorants. The wetlands and uplands of the Ballona area also probably supported several species of raptors. Some of these species continue to use the habitats currently available in the Ballona Wetlands area (Dock and Schreiber, 1981).

The majority of Ballona Wetlands currently lack tidal flushing and are dominated by non-native vegetation, rendering them largely unsuitable for most breeding and wintering birds found in Southern California wetlands subject to tidal influence. Intertidal mudflats to support foraging shorebirds are limited to a small area in the northwest of Area B surrounding a tidal channel regulated with tide-gates from Ballona Creek. Coastal saltmarsh dominated by tidally-influenced pickleweed is also limited to a similar area of Area B, although extensive areas of non-tidal pickleweed are present in Area B south of Culver Boulevard and Area A. Shallow water habitat for wading birds and dabbling ducks is limited to the few tidal channels in the northwestern portion of Area B, and no deep water is present for diving ducks and other birds that dive from the surface for fish. Foraging habitat for most raptors is limited to the western portion of Area B since much of the remaining area is densely vegetated with non-native species.

Nevertheless, many bird species forage at Ballona Wetlands during migration or for longer periods, including several special-status species. A resident population of Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), state-listed as an endangered species, is still present on Area B. Two other endangered species, the California least tern (*Sterna antillarum browni*) and peregrine falcon (*Falco peregrinus*), forage at Ballona Wetlands, and several other special-status bird species make use of habitats at Ballona frequently to rarely. The Ballona Wetlands provide habitat for a variety of bird species found in the few coastal saltmarshes remaining in coastal Southern California (Dock and Schreiber, 1981).

5.5.5.1 Bird Surveys

The first recorded systematic surveys of the Ballona Wetlands avifauna were conducted from February 1979 through June 1981 (Dock and Schreiber, 1981). Surveys were conducted each week along established transect routes, providing an excellent baseline of habitat use data for breeding, resident, wintering, and migrant species. The survey area encompassed Areas A (which they called Unit 3) and B (North and South Wetlands, which they called Unit 1 and 2, respectively) as well as Ballona Lagoon. They did not cover Area C. They recorded a total of 129 species but admitted this number was likely an underestimate as it did not include species that may occasionally use the area during migration.

The majority of the birds they observed, in terms of species and numbers, were migrants and wintering birds. Numbers of individuals ranged from over 3,000 in January to about 300 in May. Another peak in abundance occurred in late summer in Area B, corresponding to an influx of migrating waterbirds. Two endangered species, Belding's savannah sparrow and California least tern, were observed nesting on Area B. Foraging by least terns was noted at Ballona Creek and Ballona Lagoon. Belding's savannah sparrows were also observed breeding on Area A; following the nesting season, they were seen foraging on the Area B South Wetland.

Seasonal ponds on Area B supported semipalmated plover (*Charadrius semipalmatus*), killdeer (*Charadrius vociferus*), black-bellied plover (*Pluvialis squatarola*), black and ruddy turnstone (*Arenaria melanocephala* and *Arenaria interpres*), whimbrel (*Numenius phaeopus*), willet (*Catoptrophorus semipalmatus*), red-necked (formerly northern) phalarope (*Phalaropus lobatus*), short- and long-billed dowitchers (*Limnodromus griseus* and *Limnodromus scolopaceus*), dunlin (*Calidris alpina*), western sandpiper (*Calidris mauri*), and least

sandpiper (*Calidris minutilla*). They recorded wading birds typical of Southern California wetlands, including great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), and black-crowned night heron (*Nycticorax nycticorax*). Waterfowl were abundant and diverse and included gadwall (*Anas strepera*), northern pintail (*Anas acuta*), green-winged and blue-winged teal (*Anas crecca* and *Anas discors*), American wigeon (*Anas americana*), northern shoveler (*Anas clypeata*), red-breasted merganser (*Mergus serrator*), and ruddy duck (*Oxyura jamaicensis*). They recorded freshwater marsh species uncommon in Southern California, including bank swallow (*Riparia riparia*) and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Some less-commonly observed species not associated with wetlands included California quail (*Callipepla californica*), burrowing owl (*Athene cunicularia*), western kingbird (*Tyrannus verticalis*), ash-throated flycatcher (*Myiarchus cinerascens*), loggerhead shrike (*Lanius ludovicianus*), Lincoln's sparrow (*Melospiza lincolni*), and lark sparrow (*Chondestes grammacus*).

Dock and Schreiber (1981) recorded Virginia rail (*Rallus limicola*) in winter on the South Wetland of Area B but no black rails (*Latterallus jamaicensis coturniculus*) or light-footed clapper rails (*Rallus longirostris levipes*). They observed a short-eared owl (*Asio flammeus*) on Area A in February 1979, and two long-eared owls (*Asio otus*) on Area B in fall 1980. Western snowy plovers (*Charadrius alexandrinus nivosus*) were recorded occasionally on Area B mudflats in September and October 1980, and April 1981. Observed raptors included osprey (*Pandion haliaetus*), white-tailed kite (*Elanus leucurus*), and northern harrier (*Circus cyaneus*) during winter in Areas A and B, and red-tailed hawk (*Buteo jamaicensis*) and Cooper's hawk (*Accipiter cooperii*), residents in the area. Two pairs of burrowing owls nested on Area A near Ballona Creek, and burrowing owls were also believed to nest along the base of the bluffs at the eastern end of Area B (Dock and Schreiber, 1981).

Systematic ornithological surveys were again conducted from April 1990 to April 1991 (Corey, 1991). He surveyed the project area covering more area than the 1979-1981 transects, although surveys were less frequent, conducted bimonthly rather than weekly. He observed a total of 80 species, including 19 not reported by Dock and Schreiber (1981), most of which were non-resident species including house wren (*Troglodytes aedon*), warbling vireo (*Vireo gilvus*), MacGillivray's warbler (*Oporornis tolmiei*), Nashville warbler (*Vermivora ruficapilla*), and fox sparrow (*Passerella iliaca*). Conversely, many waterbird and waterfowl species seen by Dock and Schreiber (1981) were not observed by Corey (1991), probably, in part, because of differences in weather patterns (1990-1991 were drought years, while the region experienced regular or higher than normal rainfall in 1979-1981). For example, Corey (1991) did not record the majority of grebes, waterfowl, shorebirds and gulls seen by Dock and Schreiber (1981). In addition, Corey (1991) did not observe snowy plover, California quail, long-eared owl or short-eared owl. One burrowing owl was observed along the bluffs of Area D; nesting was not confirmed. No least terns were reported nesting or foraging. Belding's savannah sparrows were recorded nesting on Area B but were only observed on Area A from October through February. Raptor sightings (aside from red-tailed hawk and American kestrel - [*Falco sparverius*]) included white-tailed kite, Cooper's hawk, osprey, and red-shouldered hawk (*Buteo lineatus*) (Corey, 1991).

Dan Kahane, formerly a local birder very familiar with Ballona Wetlands, as well as Art Pickus and Richard Barth, conducted weekly surveys for the National Audubon Society from 1993 to 1998. Their survey area included Ballona Creek, Ballona Lagoon, and the western portion of the North Wetland of Area B (tidal channels and mudflats). They regularly observed various species of shorebirds and waterfowl (particularly during winter months), and raptors such as white-tailed kites and northern harriers. They also occasionally observed peregrine falcons. Some of the less common migrating species they recorded include pelagic cormorant (*Phalacrocorax pelagicus*), oldsquaw (*Clangula hyemalis*), wood duck (*Aix sponsa*), ring-necked duck (*Aythya collaris*), wandering tattler (*Heteroscelus incanus*), surfbird (*Aphriza virgata*), black skimmer (*Rynchops niger*), gray flycatcher (*Empidonax wrightii*), and willow flycatcher (*Empidonax traillii*) (National Audubon Society, 1996).

Bird surveys of Areas A, B and C were conducted by Keane Biological Consulting in 1995, 1998, and 2001 as part of environmental documentation for the proposed Playa Vista development (KBC, 1996, 1998, 2001). All bird observations were recorded as part of surveys for special-status species, and surveys covered only the spring months. Hamilton (1997) conducted breeding bird surveys in riparian habitat of Area B, now part of the Freshwater Marsh. He detected 10 species with one or more breeding territories, including mourning dove, barn owl, Anna's hummingbird, Allen's hummingbird, bushtit, western scrub-jay, common yellowthroat, California towhee, black-headed grosbeak, and song sparrow (Hamilton, 1997).

Beginning in 2001, bird surveys of a portion of Area B were conducted to provide baseline information for the evaluation of a tide-gate modification project by the USACE (KBC, 2001). One-day surveys were conducted in the spring and summer. Follow-up surveys to assess changes in the Belding's savannah sparrow population as a result of increased tidal inundation were conducted by KBC (2004, 2005) (three spring and two summer surveys each year), although other birds were recorded during surveys. Surveys focused on the portion of Area B potentially subject to increased tidal inundation as a result of the tide-gate modifications.

From 1970 to the present, local bird experts have conducted regular bird surveys at portions of Ballona Wetlands and maintained field notes of their sightings (Cooper, 2005b). Their observations have been compiled into a bird list available at: http://www.ca.audubon.org/Ballona_checklist.pdf (Cooper, 2005c).

Some of the more common birds observed on Areas A, B, and C during recent surveys are discussed below. However, several additional species are known to visit Ballona Wetlands briefly during migration (see the website address above). Although the presence of these brief visitors is generally not strongly indicative of habitat quality, many of the same species can be observed by vigilant birdwatchers in residential areas, parks and other areas of horticultural vegetation. Thus, this discussion focuses on the more common bird species of Ballona Wetlands, those that are resident (present year-round), that are summer residents (known to or believed to nest at or in the vicinity of Ballona Wetlands and forage frequently over the wetlands), or are winter residents (that are frequently observed during winter months).

5.5.5.2 Area A

Prior to the deposition of dredged material from the Marina Del Rey channel, Area A coastal saltmarsh habitat supported a bird species composition typical of Southern California coastal wetlands. However, Area A is now predominantly upland habitat dominated by non-native vegetation, although small areas of saltflats, non-tidal pickleweed, coyotebush scrub and mulefat scrub are also present. The upland habitats of Area A support mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltirparus minimus*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), Brewer's blackbird (*Euphagus cyanocephalus*), song sparrow, lesser goldfinch (*Carduelis psaltria*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Belding's savannah sparrows formerly nested at Area A, but the quality of potential habitat for this bird on Area A has declined over time due to leaching of residual salts, and none have been recorded nesting here since 1987. Raptors observed foraging over Area A include the red-tailed hawk and American kestrel, and the white-tailed kite. Several recent sightings of burrowing owl have been recorded on Area A during the winter, although it is not currently known whether the species has or will remain to breed. Great blue herons and great egrets often use Area A for roosting, and great blue herons, which nest in trees on the north side of Fiji Way, use Area A for gathering nesting materials.

5.5.5.3 Area B

Bird species that can be observed nearly year-round in and adjacent to tidal channels on Area B include great blue heron, black-crowned night heron, green heron (less common), great egret, snowy egret, killdeer, and willet. Western meadowlark (*Sturnella neglecta*) nests in the pickleweed habitat of the western portion of Area B. Belding's savannah sparrows breed in pickleweed saltmarsh habitat in the northwestern portion of Area B. Great blue herons formerly nested in a cottonwood tree at the western end of Area B (KBC, 1996) and currently nest in trees north of Ballona Creek (Cooper, 2005a-f).

Wintering species of the Area B tidal saltmarsh, tidal channels and saltflats include black-bellied plover, willet, whimbrel, western sandpiper, and least sandpiper. California brown pelicans (*Pelicanus occidentalis californicus*) are occasionally observed flying over Area B but more frequently over Ballona Creek (the tidal channels of Area B are generally too shallow for foraging). Less commonly observed species of Area B tidal channels, and on flooded saltpans following heavy rains, include brant (*Branta bernicla*), northern shoveler (Cooper, 2005b), and gadwall. Gull species observed on Area B saltflats include California gull (*Larus californicus*), ring-billed gull (*Larus delawarensis*), Western gull (*Larus occidentalis*), and Bonaparte's gull (*Larus philadelphia*). During early spring months, flocks of elegant terns (*Sterna elegans*), Caspian terns (*Sterna caspia*) and black-bellied plovers are observed on the Area B saltflats.

Species observed in the spring on Area B include northern rough-winged swallow (*Stelgidopteryx serripennis*), barn swallow, cliff swallow (*Hirundo pyrrhonota*), Bullock's oriole (*Icterus bullockii*), and both Caspian and elegant terns roosting on saltflats. The saltflats of Area B historically supported nesting by the California least tern, and one pair nested here unsuccessfully in 2001. During the late summer, several

species of sandpiper and plover that arrived in Southern California from breeding grounds in Canada and Alaska occasionally make use of Area B tidal channels and saltflats subject to tidal inundation.

The most commonly observed bird species in the upland habitats of Area B are American crow, European starling, common yellowthroat (*Geothlypis trichas*) and house finch; other species include mourning dove, belted kingfisher (*Ceryle alcyon*), Anna's hummingbird, western kingbird, black phoebe, bushtit, northern mockingbird, western scrub-jay (*Aphelocoma californica*)², red-winged blackbird, song sparrow, California towhee (*Pipilo crissalis*), lesser goldfinch, and house sparrow. In the winter months, Say's phoebe (*Sayornis saya*), blue-gray gnatcatcher (*Poliophtila caerulea*), ruby-crowned kinglet (*Regulus satrapa*), yellow-rumped warbler (*Dendroica coronata*), and white-crowned sparrow (*Zonotrichia leucophrys*) have been observed in the uplands of Area B. Great-tailed grackles (*Quiscalus mexicanus*)³ have also been recently observed on Area B. A loggerhead shrike (*Lanius ludovicianus*) has also been observed south of Culver Boulevard in 2001, 2003, and 2004 (KBC, 2001, 2004, 2005). Vagrant species (birds out of range) seen during recent surveys on Area B include a bobolink (*Dolichonyx oryzivorus*), a bird typically observed in the northern United States, in 2001, and a grasshopper sparrow (*Ammodramus savannarum*), generally observed in extensive undisturbed grasslands, in 2004 (KBC, 2001, 2004).

Common raptors of Area B include American kestrels, red-tailed hawk, which roosts and possibly nests in the eucalyptus trees in the southwestern end of Area B, red-shouldered hawk (*Buteo lineatus*), Cooper's hawk, white-tailed kite, and occasionally great horned owl (*Bubo virginianus*). Peregrine falcons are frequently observed foraging over Area B.

Following construction of the Freshwater Marsh, bird surveys were conducted by KBC (2003) and Cooper (2004, 2005a). The various habitats of the marsh (open water, emergent, mixed riparian, willow scrub, mudflat) have been visited by more than 135 species of birds and breeding has been documented by species including pied-billed grebe (*Podilymbus podiceps*), black-necked stilt (*Himantopus mexicanus*), barn swallow (*Hirundo rustica*), common yellowthroat (*Geothlypis trichas*), red-winged blackbird (*Agelaius phoeniceus*), ruddy duck, and song sparrow (*Melospiza melodia*) (Edith Read, personal communication and the Ballona Freshwater Marsh website:

http://www.cnlm.org/cms/index.php?option=com_content&task=view&id=36&Itemid=80).

5.5.5.4 Area C

Area C consists primarily of non-native vegetation as well as habitats dominated by native plant species, such as coyote brush and coastal sage scrub species, and supports a low diversity of birds as compared to Areas A and B. In addition, it is subject to higher levels of human disturbance than Areas A and B - tracks of domestic dog (*Canis domesticus*) and humans, including mountain bicycle tracks, are present throughout Area C. Bird

² Observed year-round at Ballona since 2002 but otherwise scarce along the immediate coast in the vicinity of Ballona (Cooper, 2005a-f).

³ This species was first observed at Ballona in 2002 and 42 pairs nested at the Ballona Freshwater Marsh in 2003 (Cooper, 2005a-f).

species typically observed on Area C during recent surveys included American kestrel, mourning dove, rock dove, killdeer (*Charadrius vociferus*), Anna's hummingbird, American crow, black phoebe, northern mockingbird, song sparrow, California towhee, house finch, and house sparrow. Peregrine falcons are occasionally observed foraging over Area C (Cooper, 2005d).

5.5.5.5 Adjacent Habitats

Wetland habitats adjacent to Ballona Wetlands include Ballona Creek, Ballona Lagoon, Del Rey lagoon, and the open water habitat of Marina Del Rey. Birds frequently observed flying over Ballona Creek include brown pelican, great blue heron, willet, Caspian tern, elegant tern, California least tern, and other species foraging for fish and benthic invertebrates including double-crested cormorant (*Phalacrocorax auritus*), and a variety of wading birds and shorebirds during the winter months. Several species of gull are often observed flying over Ballona Creek, and California least terns are frequently observed foraging over Ballona Creek during their nesting season - a protected California least tern nesting site, one of only two in Los Angeles County, is present just north of the Marina Del Rey channel mouth. Ballona Creek also provides important habitat for several bird species for feeding and roosting including the Bonaparte's gull (up to 2500 birds in winter), black-bellied plover (up to 700 birds), willet (up to 1000 birds), and marbled godwit (*Limosa fedoa*) (over 100 birds). In addition, the strongly tidal section between Lincoln Boulevard and Centinela Creek can support 100's of waterfowl (particularly green-winged teal and American wigeon) and mudflat species such as dowitchers (*Limnodromus* sp.), as well as roosting terns. West of Lincoln Boulevard, the Creek deepens towards the ocean and supports species typically found in deeper waters such as lesser scaup (*Aythya affinis*) and bufflehead (*Bucephala albeola*), also found in Santa Monica Bay. Thus, Ballona Creek is ecologically linked to Santa Monica Bay and Ballona Wetlands (Cooper, 2005f).

Bird species observed at Ballona Lagoon include nesting green herons (Cooper, 2005b), great blue herons, great egrets, snowy egrets, and a variety of waterfowl species during the winter months. The Santa Monica Bay Audubon Society conducted 29 monthly surveys of Ballona Lagoon in 1996 and 1997 and counted 59 bird species (Almdale, 1998). The open-water habitat of Marina Del Rey supports brown pelicans, several species of gull, double-crested cormorant, and occasional waterfowl and grebe species. California least terns have been observed foraging in Marina Del Rey near the Coast Guard Station. Great blue herons and black-crowned night herons nest in horticultural trees in Marina Del Rey along Fiji Way and Admiralty Way (Keane, personal communication).

Bird species of Del Rey Lagoon south of Ballona Creek are most diverse in late summer, late fall and spring because of the presence of migratory shorebirds including long-billed dowitcher, western and least sandpipers, black-bellied and semipalmated plovers, killdeer, greater yellowlegs and whimbrel. Waders such as great blue heron and great and snowy egrets are observed foraging here year-round. During the winter, gulls and waterfowl are the most common species at the Lagoon including lesser scaup, bufflehead, American coot, black-bellied plover, willet and marbled godwit. Vegetation surrounding the Lagoon is also important to several species of briefly-visiting migratory land birds (Cooper, 2006).

Upland habitats adjacent to Ballona Wetlands are limited to developed areas including both residential and commercial developments. Bird species well adapted to human-modified habitats in coastal Southern California, most commonly found in these areas, include mourning dove, Anna's hummingbird, Allen's hummingbird (*Selasphorus sasin*), black phoebe, American crow, northern mockingbird, European starling, house finch, and house sparrow.

5.5.5.6 *Special-Status Birds*

Several bird species known to occur in the vicinity of Ballona Wetlands are afforded special-status designation by resource agencies and conservation organizations, as follows:

- birds listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA);
- birds listed as 'fully protected' under the California Fish and Game Code;
- birds designated as 'Species of Special Concern' by the CDFG, which serves as a designation for species of limited distribution or that have had substantial reductions in range or habitat, such that threats to their populations may be imminent.

In addition to the bird surveys in Section 5.5.5.1, references consulted for sightings of special-status bird species at Ballona Wetlands and vicinity included the CNDDDB and a list of special-status species of Ballona Wetlands (Cooper, 2005b). Other references used to determine the status of special-status species included:

- State and Federally Listed Endangered and Threatened Animals of California, CDFG, Natural Heritage Division, July 2005 (CDFG 2005a). Available: <http://www.dfg.ca.gov/whdab/pdfs/TEAnimals.pdf>
- State and Federally Listed Endangered, Threatened and Rare Plants of California, CDFG, Natural Heritage Division, July 2005 (CDFG 2005b). Available: <http://www.dfg.ca.gov/whdab/pdfs/TEPlants.pdf>
- Special Animals (including California Species of Special Concern), CDFG, Natural Heritage Division, July 2005 (CDFG 2005). Available: <http://www.dfg.ca.gov/whdab/pdfs/spanimals.pdf>.

Historical Perspective for Special-Status Birds

Prior to human modifications, Ballona Wetlands supported many species of breeding birds that are less common today because of the loss or degradation of coastal wetlands in California. For example, California black rail, which may be extirpated as a breeder from coastal Southern California is reported as occurring at Ballona Wetlands in the early 1900's (Bent, 1926). Light-footed clapper rails were recorded until at least 1949 in Playa Del Rey (Garrett and Dunn, 1981). Western snowy plovers nested near 'Ballona Swamp' in 1903 (Chambers, 1904); and in 'Del Rey' in 1914 (Willet, 1933). California least terns nested on the beaches of Los Angeles County from 'Santa Monica southward' in 1899 (Bent, 1921) and likely foraged in tidal channels throughout Ballona Wetlands. They were also reported nesting at Playa Del Rey (Grinnell and Miller, 1944). Belding's savannah sparrow nested in extensive pickleweed that was present prior to human

disturbance; they were reported from Ballona Wetlands in the late 1800's (Grinnell, 1898). Several raptor species less common today were probably residents (present throughout the year) in the area, including northern harrier, short-eared owl, and burrowing owl. Riparian habitats in the area supported red-shouldered hawks, Cooper's hawks and white-tailed kites (Cooper, 2005e).

Surveys for Special-Status Birds

From 1973 to 1981, surveys for nesting California least tern were conducted at Area B; thereafter, these birds nested at a site created north of Ballona Creek. Surveys for Belding's savannah sparrow were conducted some years from 1977 to 1994 on Areas A and B. Numerous sightings of special-status species have been recorded in recent years by birders very active in Ballona Wetlands and vicinity; those since 2003 are summarized by Cooper (2005e). Otherwise, focused surveys for special-status species at Ballona Wetlands were sporadic until 1995, when KBC conducted biological surveys for the proposed Playa Vista development. Surveys were conducted in spring 1995 in areas of suitable habitat and pursuant to available and current survey protocol (or, if no protocol were established, according to methods recommended by known experts on the species) for the following special-status bird species with at least a marginal potential for occurring at Ballona Wetlands: black rail, light-footed clapper rail, western snowy plover, California least tern, white-tailed kite, northern harrier, peregrine falcon, Cooper's hawk, osprey, long-eared owl (*Asio otus*), short-eared owl (*Asio flammeus*), burrowing owl, southwestern willow flycatcher (*Empidonax trailii extimus*), California gnatcatcher (*Poliophtila californica californica*), least Bell's vireo (*Vireo belli pusillus*), and Belding's savannah sparrow. Survey results in 1995 (KBC, 1996) were limited to:

- Occasional foraging dives in Area B tidal channels by California least terns;
- Twenty one Belding's savannah sparrows exhibiting territorial behavior suggesting nesting on Area B near the Ballona Creek tide-gates (none were observed on Area A);
- One willow flycatcher (unknown sub-species) in nontypical nesting habitat on Area A; it was not singing or exhibiting other breeding behavior and was not seen again, indicating it was a migrant and not breeding at Ballona Wetlands; no least Bell's vireos or southwestern willow flycatchers were observed and are not discussed further;
- One peregrine falcon observed over Area C during related surveys;
- Foraging white-tailed kites and northern harriers were observed at Areas A and B.

Follow-up surveys by KBC which were conducted in 1998 and 2001, found Belding's savannah sparrows nesting at Area B but not Area A, and foraging by California least terns in Area B tidal channels. A white-tailed kite was observed in Area B in 2001, but no other special-status species were observed during the surveys. Focused surveys for Belding's savannah sparrows were conducted in 2001, 2002, 2004 and 2005. No focused surveys for other special-status birds have been conducted since 2001. Results of these surveys and the status of other special-status species for which potential habitat is present at Ballona Wetlands are discussed below.

Current Perspective for Special-Status Birds

The Ballona Wetlands currently support habitat for two species listed by CDFG: the Belding's savannah sparrow, present year-round and the only endangered bird species known to currently breed at Ballona Wetlands; and the peregrine falcon, which forages occasionally to commonly. In addition, one species listed as endangered by both CDFG and the USFWS, the California least tern, forages in the tidal channels of Area B. California least terns historically nested, and recently, occasionally (as in 2001) attempted to nest on the Area B saltflats (KBC, 2001). A variety of other bird species designated as California Species of Special Concern also make use of habitats at Ballona Wetlands. Each of these is discussed below and summarized Appendix B-5.

Endangered Birds Currently Present

Brown Pelican

The California brown pelican occurs in the marine environments of North and South America, including open beaches, lagoons, tidal rivers, rocky coasts, jetties and breakwaters, and islands. California brown pelicans do not breed on the mainland but nest colonially on the Channel Islands off the coast of Southern California, on islands along the west coast of Baja California, and in the Gulf of California (Anderson and Gress, 1983). The California brown pelican population has increased in recent years but it remains federally and state-listed as an endangered species.

After the breeding season, brown pelicans leave the islands and disperse along the entire California coast and thus are most common in Southern California from June to October (Garrett and Dunn, 1981). Six aerial surveys by Jacques et al. (1995) from the California-Mexico border to Point Conception found the highest numbers in June and September. The majority of pelicans (65%) were found on artificial structures, primarily breakwaters, most of which were associated with harbors and marinas (Jacques et al., 1995). The Marina Del Rey breakwater supported the second-highest percentage of total roosting pelicans of 20 roosting sites surveyed.

Brown pelicans are occasionally observed flying over Ballona Wetlands but are more commonly observed over Ballona Creek, since tidal channels at the wetlands are too shallow to support brown pelican foraging.

California Least Tern

The California least tern is a migratory species that nests from April through August along the coast of California from San Francisco south to Baja California, nesting on sparsely vegetated sandy beaches, salt flats, and dredged spoil in colonies of up to several 100 nesting pairs. It presumably winters in Central America or northern South America, although the specific location of its wintering range is unknown (Massey 1974). The sub-species was listed as endangered under the Federal Endangered Species Act in 1970 and by the California Endangered Species Act in 1971, when state-wide censuses indicated that nesting pairs were limited to 600.

The salt flats of Area B North Wetland, just east of the main drainage channel, were used by 10 to 22 pairs of least terns from 1973 through 1976 (Dock and Schreiber, 1981; Loosli, 1978). Flooding of the salt flats due

to rain early in the 1977 nesting season apparently prompted birds to nest for the first time on the beach (the 'Venice Beach' site) north of the Marina Del Rey channel. A small group also nested in 1977 along a channel at the end of Beethoven Street (north of Area C), which was not used thereafter. Approximately 25 pairs of terns used the salt flats of Area B in 1978 and 1979 (CDFG unpublished annual reports). Dock and Schreiber (1981) reported 17 pairs in 1979. Terns continued to nest on the salt flats in 1980 and 1981, although flooding both years precluded the production of any fledglings. Table 5-6 summarizes least tern nesting activity and productivity in the Ballona Wetlands vicinity through 2005.

Table 5-6. History Of California Least Tern Nesting in the Vicinity of Ballona Wetlands, 1973-2005

Year	Nesting Location	Number Of Nesting Pairs	Number Of Fledglings
1973 - 1976	Salt flats Area B	10 to 22	not recorded
1977	Venice Beach	35	30+
1977	Beethoven Street Fill	3	None
1978	Salt flats Area B	25-30	30
1978	Venice Beach	60-75	75
1979	Salt flats Area B	18-25	25
1979	Venice Beach	80-95	140
1980	Salt flats Area B	+	0
1980	Venice Beach	150-165	240
1981	Salt flats Area B	16	0
1981	Venice Beach	140-160	195
1982-1996	Salt flats Area B	0	0
1982-2005	Venice Beach ^a	82 to over 300	60 to over 300 ^b

^a one pair of least terns nested at Area B in 2001 but the nest was unsuccessful (KBC, 2001)

^b the number of fledglings produced in recent years has been very low to zero due to predation by American crows

Studies on least tern foraging behavior in 1980 and 1981 included potential foraging habitat in the vicinity of the Venice Beach least tern nesting site just north of Ballona Creek (Atwood and Minsky, 1983). The tidal channels of Area B supported up to 13% of the total foraging of a given survey date in 1980, but foraging at Area B was less frequent in 1981. In 1995, 1998, and 2001, KBC conducted foraging surveys for least terns at the tidal channels of Area B and Marina Ditch in Area A. Foraging was documented in Area B tidal channels on three of seven survey dates in 1995, on three of 14 survey dates in 1998 and on seven of 17 surveys in 2001 (KBC, 1996, 1998, 2001). No least terns were observed at Area A.

It is unlikely that California least terns will attempt to nest again at Ballona Wetlands without an effective predator management plan that includes adequate and well-maintained fencing and a reduction in the red fox population. However, California least terns will likely continue to forage in the freshwater and tidal creeks of Ballona Wetlands as long as these areas support small fish. The tidal channels on Area B may be most important during the chick phase of nesting, as well as during years when offshore prey is limited.

Peregrine Falcon

The peregrine falcon was once a fairly common permanent resident along the coast of California, taking various species of birds as prey (Grinnell and Miller, 1944). No historical records specifically denote its occurrence in the vicinity of Ballona Wetlands, but it was probably uncommon to fairly common during winter and migration. Peregrine falcons are frequently recorded at Ballona Wetlands by National Audubon Society observers (Pickus, 1996). The peregrine falcon is listed as an endangered species by the State of California; it was formerly also listed by the USFWS but its national population recovered to the point that it was delisted in August 1999. Peregrine falcons are frequently observed (13 sightings in 2003; 11 sightings in 2004) foraging over Area B and occasionally over Area C (one sighting in 2003). It may also forage at Area A, at least occasionally, but this area is not visited as frequently by birders to document its presence.

Belding's Savannah Sparrow

Several of the 17 sub-species of savannah sparrow (*Passerculus sandwichensis*) are residents of coastal saltmarshes of the southwestern United States and Mexico. These include the large-billed savannah sparrow (*Passerculus sandwichensis rostratus*), which occurs along the east and west shores of the Gulf of California and is occasionally observed at Ballona Wetlands (Cooper, 2005a-f) and the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), which is found from Morro Bay south to El Rosario, Baja California (Wheelwright and Rising, 1993) and nests at Ballona Wetlands and several other coastal saltmarshes in Southern California. The Belding's savannah sparrow was listed by the CDFG as endangered in 1974. It is not currently listed as endangered or threatened by the USFWS.

Belding's savannah sparrows occupy coastal saltmarshes and estuaries where pickleweed is dominant. They eat a variety of crustaceans as well as seeds of pickleweed and may forage in other nearby habitats including along rock jetties (Garrett and Dunn, 1981).

State-wide censuses are conducted approximately every five years. In 1986 the count was 2,274 breeding pairs, with the majority at Point Mugu Naval Air Station in Ventura County (Zemba et al., 1988). Upper Newport Bay and Bolsa Chica in Orange County also supported high-quality habitat and relatively stable populations (Zemba et al., 1988). A state-wide survey in 1996 estimated 2,350 breeding pairs, and the most recent survey in 2001 estimated 2,902 breeding pairs (R. Zemba, personal communication). Thus, the population at Ballona Wetlands that year (13) represented 0.45% of the State's population.

Grinnell and Miller (1944) reported Belding's savannah sparrow at Ballona Wetlands in the late 1800's. They have likely continued to nest on Area B since that time, and several focused surveys conducted since 1977 (Table 5-7) indicate that the recent population on Area B appears to be relatively stable, with 11 to 13 pairs from 1998 to 2005.

Table 5-7. Results of Surveys for Belding's Savannah Sparrow at Playa Vista, 1977 to 2005

Year	# Pairs Parcel B	# Pairs Parcel A	Surveys Conducted By
1977	37 pairs	No data	Massey 1977
1979	21	18	Dock and Schreiber 1981
1980	18	10	Dock and Schreiber 1981

Year	# Pairs Parcel B	# Pairs Parcel A	Surveys Conducted By
1981	13	10-13	Dock and Schreiber 1981
1982 – 1985	No data	No data	--
1986	32	No data	Zembal et al. 1988
1987	30	5	Massey 1987
1988	No data	No data	--
1989	31	0	White 1989
1990	11-12	0	Corey and Massey 1990
1991	1 to 30 throughout the year	0 breeding; up to 7 Oct. to Feb.	Corey 1991
1992 – 1993	No data	No data	--
1994	10	0	Lockhart 1994
1995	21	0	Keane Biological Consulting 1996
1996	37 ^a	0	John Konecny, USFWS
1997	No surveys	No surveys	No surveys
1998	12 to 13	0	Keane Biological Consulting 1998
1999	No surveys	No surveys	--
2000	No surveys	No surveys	--
2001	13 to 15	0	Keane Biological Consulting 2001
2002	No surveys	No surveys	--
2003	No surveys ^b	No surveys	Keane Biological Consulting 2004
2004	12	No surveys	Keane Biological Consulting 2004b
2005	11	No surveys	Keane Biological Consulting 2005

Boland and Zedler also observed territorial Belding's savannah sparrows in Area B in 1990 (Boland and Zedler, 1991).

Area A supported nesting Belding's savannah sparrows through the mid-1980's. However, Dock and Schreiber (1981) noted that the quality of pickleweed habitat on Area A appeared to decline over their study period from 1979 to 1981. Even at that time, Area A was not subject to tidal influence, and pickleweed was present only because of leaching by winter rains of residual salt in dredged spoils left from construction of Marina Del Rey. Dock and Schreiber (1981) predicted that the health of the pickleweed habitat on Area A would continue to decline to the point where Belding's savannah sparrows may no longer nest there. As predicted, Massey (1989, 1990) found no breeding pairs on Area A in 1989 or 1990, stating that 'the habitat did not look healthy; the ground was very dry and there were many invasive upland weeds in the Salicornia'. Corey (1991) noted up to seven individuals on Area A during the fall/winter months of 1990 and 1991, occasionally in mixed flocks with the migrant sub-species of savannah sparrow, but did not record any breeding pairs, and none have been observed on Area A during focused surveys in 1995, 1998, and 2001 (KBC, 1996, 1998, 2001). Thus, Belding's savannah sparrows may forage occasionally on Area A during winter months (Corey, 1991), but are unlikely to nest on Area A in its current condition.

Other Special-Status Species Currently Present

Elegant Tern

The elegant tern is a California Species of Special Concern that in recent years has been observed roosting in large numbers on Area B in the early spring and late summer. These individuals are likely to nest in Los Angeles Harbor, where elegant terns initiated nesting within a protected area set aside for the California least tern, beginning in 1997 (KBC, 1997). Although 1000's of elegant terns from Mexico spend the summer and fall along the California coast, the Los Angeles Harbor, Bolsa Chica wetlands, and the salt work dikes at the southern end of San Diego Bay are the only breeding sites in California. The Ballona Wetlands appear to be very important for pre- and post-breeding concentrations of several 100 elegant terns (Cooper, 2005e).

Burrowing Owl

Burrowing owls breed throughout much of western North America and in California are most common in desert areas. They are nearly extirpated as a nesting species from many areas of coastal Southern California, but a small influx of burrowing owls occurs in the winter (Garrett and Dunn, 1981). The burrowing owl has been listed as a California Species of Special Concern since 1978. It is currently not listed by California or federal Endangered Species Acts, although an attempt to list it recently under the California Endangered Species Act failed. Burrowing owls forage primarily at night but are also relatively active in daytime hours compared with most other owls. They do not dig burrows, but in Southern California primarily use those of California ground squirrels (*Spermophilus beechyi*), enlarging and modifying them as needed.

Dock and Schreiber (1981) reported that two pairs of burrowing owls apparently nested on Unit 3 (Area A), and that owls were observed occasionally on Units 1 and 2 (Area B North and South Wetlands) and 'along bluffs south of the agricultural area, where they probably nest.' Corey (1991) mentions, 'one on the Westchester Bluffs in April 1990. Nesting not confirmed.' Burrowing owl surveys were conducted by KBC (1995). No burrowing owls were observed during the surveys, although a pellet that may have been discarded by a burrowing owl was located on Area A on June 8, 1995. California ground squirrels and their burrows were noted in some locations, and the physical habitat required by burrowing owls appears to remain on the site.

Several recent burrowing owl observations have been reported by a local birder (Cooper, 2005e), and at least one wintering owl occupied a burrow in Area B, but this individual did not remain to breed in 2006 (B. Henderson PC). The potential for long-term occurrence of burrowing owls at Ballona Wetlands in their current condition is low due to the high density of non-native predators, including domestic dogs, cats, and red foxes.

Northern Harrier

Formerly called marsh hawk when designated a California Species of Special Concern in 1978, the northern harrier was historically a common resident of the Southern California coast (Grinnell and Miller, 1944), but both breeding and wintering populations have declined. It is now considered fairly common in winter, and rare and local as a breeder in coastal Southern California (Garrett and Dunn 1981). Northern harriers nested at Ballona Wetlands as recently as 1953 (Cooper, 2005a-f). The species was recorded as a sporadic visitor by

Dock and Schreiber (1981). Northern harriers forage over open habitats including coastal saltmarshes such as Ballona Wetlands and formerly occurred here throughout the winter through the mid-1990's (Cooper, 2005a-f). Winter residents are no longer documented, although individual northern harriers are recorded at least once every winter (Cooper, 2005a-f).

White-tailed Kite

The white-tailed kite, a California fully-protected species, was formerly widespread in valley and foothill habitats prior to 1895. It typically forages in open grasslands, meadows and marshes (Grinnell and Miller, 1944). It was regularly seen on Areas A, B, and C during winter by Dock and Schreiber (1981), and was observed occasionally on Area B by Corey (1991). During 1995 surveys, one adult and one juvenile were observed occasionally, most commonly on Area A, and three to five birds are observed through the spring and summer (Cooper, 2005a-f). They may nest somewhere at Ballona Wetlands and are probably residents in the area.

Cooper's Hawk

The Cooper's hawk, a California Species of Special Concern, is a resident species that was formerly common to abundant in California during the fall in open riparian and deciduous woodlands (Grinnell and Miller, 1944) and is now becoming more common in some residential areas. The species was likely to be fairly common at least in winter and during migration at Ballona Wetlands. Both Dock and Schreiber (1981) and Corey (1991) recorded occasional sightings of Cooper's hawk on Areas A and B. Cooper's hawk is commonly observed at Ballona wetlands, and may nest in the eucalyptus grove or in adjacent residential areas.

Osprey

Osprey was formerly a summer resident in Southern California and an occasional winter visitor, occurring near the ocean and lakes (Grinnell and Miller, 1944). It was an uncommon migrant over Areas A and B in 1979-1981 (Dock and Schreiber, 1981). Corey (1991) recorded one over Area B during the summer of 1990, but it likely did not nest here. Several individuals were observed in 2005, including one near Ballona Creek and Area C in September 2005 and July 2006 (Brad Henderson, personal communication). The osprey is expected to occur occasionally at Ballona Wetlands, particularly during the winter months.

Loggerhead Shrike

The loggerhead shrike, a California Species of Special Concern, is an uncommon but widespread resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. It is generally rare in urbanized areas but can occasionally be found in suburban parks. It preys upon small birds, reptiles, and insects in open habitats with scattered trees. This type of habitat is becoming scarce in Southern California, and in the Los Angeles Basin and adjacent valleys and Santa Monica Mountains, the loggerhead shrike breeding population has declined in recent years to an estimated three to eight pairs. Numbers of wintering shrikes have also declined from double-digit numbers to one or two individuals (Garrett, personal communication). The last locally nesting shrikes were recorded on Ballona Wetlands in the mid-1990's, although territorial behavior was observed east of Lincoln Boulevard in 1998, and an adult accompanied by a juvenile was present for one day near the

Freshwater Marsh (Cooper, 2005b). This species breeds in tall shrubs and trees, and was frequently observed south of Culver Boulevard on Area B during spring surveys in 2001, during summer and fall surveys in 2003 and during summer surveys in 2004 (KBC, 2001, 2004, 2005) and thus may have nested at Ballona Wetlands.

Special-Status Birds No Longer (or Rarely) Present

California Black Rail

Black rail is the smallest rail in North America and has a wide distribution in both coastal and freshwater marshes. Black rails along the west coast tend to nest in the upper reaches of coastal saltmarshes, in areas dominated by rushes and sedges; pickleweed-dominated habitats support few rails (Evens et al., 1994). Despite the lack of suitable habitat at Ballona Wetlands, because the species historically occurred in the area, KBC conducted focused surveys for black rail in areas of suitable habitat in 1995 and 2001. No black rails were seen or heard. Given the paucity of recent sightings for this species south of Morro Bay, the lack of well-developed coastal saltmarsh habitat on Ballona Wetlands, and the presence of red fox in the area, it is highly unlikely that black rails would currently breed at Ballona Wetlands. In any case, models predict that 10 to 25 breeding pairs are necessary to sustain a population (Shaffer, 1981 in Evens et al., 1991). Population isolation and the lack of significant dispersal indicates that the probability of sustained existence for black rail in many areas is low (Evens et al., 1991).

Light-footed Clapper Rail

The light-footed clapper rail occurs along the Pacific Coast from Bahia de San Quintin, Baja California, north to Carpinteria Marsh, Santa Barbara County (Zemba and Massey, 1981; Zemba, 1991). It is a resident of coastal saltmarshes of Southern California and occupies tidal habitats dominated by cordgrass (*Spartina* sp.) and pickleweed. Light-footed clapper rail was listed as endangered by the USFWS in 1970, and by CDFG in 1971.

Light-footed clapper rail was recorded as recently as 1949 at 'Playa Del Rey' (Garrett and Dunn, 1981). However, rail has been absent as a breeder from Los Angeles County since the 1960's (Massey et al., 1984), although individuals may occur here during dispersal. A clapper rail was observed and photographed in January 1995 by David de Lange near Ballona Creek in the North Wetland of Area B (H. Towner, personal communication). Censuses for clapper rails have been conducted state-wide from 1980 through 2005, but surveys have typically not covered the Ballona Wetlands area due to a lack of suitable breeding habitat. Focused surveys for light-footed clapper rail were conducted by KBC in 1995 and 2001, and no clapper rails were observed (KBC, 1996, 2001). Because of a lack of suitable breeding habitat and the presence of red fox, light-footed clapper rails are unlikely to breed at Ballona Wetlands. In addition, breeding habitat typically includes a large component of cordgrass, which does not occur on Ballona Wetlands (Hendrickson, 1991a). However, individual clapper rails, such as the one observed in January 1995, may occur for short periods at Ballona Wetlands during dispersal but are unlikely to breed at Ballona Wetlands in their current state.

Western Snowy Plover

The coastal population of western snowy plover (*Charadrius alexandrinus nivosus*) breeds along the Pacific coast from southern Washington to southern Baja California on sparsely vegetated beaches backed by dunes,

dredged spoils, flats of salt evaporation ponds, and river bars. During winter months it withdraws from the northerly parts of its range southwards (Grinnell and Miller, 1944). The coastal population of western snowy plover was listed as threatened by the USFWS in 1993 (USFWS, 1993a).

Western snowy plovers nested near 'Ballona Swamp' in 1903 (Chambers, 1904) and in 'Del Rey' in 1914 (Willett, 1933). In 1903, one egg collector reported 50 pairs of plovers along a two-mile stretch of beach ('Ballona Beach') between Ballona and Santa Monica (Page et al., 1991). In 1947, a plover incubating its eggs was photographed on Manhattan Beach (Page et al., 1991). Page and Stenzel (1981) also reported that suitable habitat, but no nesting plovers, was seen in 1923 at the 'Playa Del Rey Salt Flats'. Surveys during the 1978 breeding season included Manhattan Beach, Playa Del Rey, Playa Del Rey Salt Flats (probably Area B), and Ballona Beach and no plovers were observed (Page and Stenzel, 1981).

Snowy plovers were recorded occasionally on Area B mudflats in September and October 1980 and April 1981 but no nesting individuals were reported (Dock and Schreiber, 1981). Surveys for wintering populations by Page et al. (1986) from 1978 to 1985 included nine counts at Ballona Creek and Playa Del Rey. Corey (1991) did not observe snowy plovers during any of his surveys. Snowy plovers have been recorded recently along beaches in the vicinity of Ballona Wetlands but none have been observed on Areas A, B or C. KBC conducted focused surveys for western snowy plover on Areas A and B in spring 1995 and none were observed (KBC, 1995). KBC focused surveys on Area A in 1998 and 2001 and on Area B in 2004 and 2005 recorded no western snowy plovers (KBC, 1998, 2001). The prevalence of red foxes (they were observed during nearly every survey, and/or tracks or droppings were noted) suggests that western snowy plovers are unlikely to currently breed at Ballona Wetlands, although they may be present briefly during the winter and during migration.

Short-eared Owl

Short-eared owls breed in tall grasslands and the upper portions of coastal saltmarshes and were apparently uncommon breeders in coastal Southern California up until at least the 1920's (Grinnell and Miller, 1944). They have since been completely or nearly extirpated, with only a single known breeding (Santa Barbara Island; McCaskie, 1992) in nearly 50 years (Remsen, 1978; Garret and Dunn, 1981). Formerly common in Southern California in the winter (Grinnell and Miller, 1944), they are now rare to very uncommon (Garrett and Dunn, 1981). The short-eared owl is listed as a California Species of Special Concern and currently has no listing status per the Federal or California Endangered Species Acts.

Dock and Schreiber (1981) observed a short-eared owl on Area A in February 1979. Three short-eared owls have been sighted during 14 winters between 1947 and 1996; recent observations are limited to one individual in 2000 and one in 2004 (Cooper, 2005a-f). Suitable habitat for the short-eared owl is limited to the non-tidal marsh uplands, such as the weedy fields of Area A and the eastern end of Area B. Focused surveys for the short-eared owl were conducted by KBC in 1995, and no short-eared owls were observed (KBC, 1995). Because Ballona Wetlands are heavily visited by potential predators, including domestic dogs and cats, as well as non-native red fox, it is unlikely that any pioneering short-eared owl would be successful in attempting to breed. However, recent records indicate that the migrating short-eared owls may continue to occur rarely at Ballona Wetlands.

Long-eared Owl

This species was formerly rather common and widespread as a breeder throughout Southern California, but is now described as rare and local (Bloom, 1994). In California, breeding habitat for long-eared owls includes desert oases, tamarisk thickets and dense riparian habitats (especially oak riparian woodlands) (Marks et al., 1994). Numbers of long-eared owls increase in the winter, but the species is still very uncommon during winter in coastal Southern California (Garrett and Dunn, 1981). The long-eared owl is listed as a California Species of Special Concern but the listing refers only to its nesting grounds. It currently has no listing status per the Federal or California Endangered Species Acts.

Dock and Schreiber (1981) reported ‘one or two individuals flushed from trees along Unit 3 in February of 1979,’ although other ornithologists have questioned the reliability of this sighting, given the fact that most recent records were from 1929 and 1934 (Cooper, 2005a-f). Suitable habitat for the long-eared owl at Ballona Wetlands is limited to areas of dense trees, such as the eucalyptus trees at the western end of Area B and the willow woodland just west of Lincoln Boulevard on Area B. KBC conducted surveys for long-eared owl in 1995 and none were observed (KBC, 1995). Given the limited nature of potential habitat at Ballona Wetlands, the lack of sightings during the past 70 years, and the presence of known predators including great horned owls and red-tailed hawks, it is highly unlikely this species will breed or winter at Ballona Wetlands in their current state.

Other Special-Status Birds Considered Extirpated from Ballona

A variety of other special-status species that were observed historically at Ballona Wetlands and may return following restoration include the least Bell’s vireo and California gnatcatcher (no sightings of these two species have been recorded in recent years and none were observed during focused surveys in 1995, 1998 and 2001 in areas of suitable habitat in southeastern Area B [KBC 1996, 1998, 2001]), horned lark (*Eremophila alpestris*), yellow-breasted chat, tricolored blackbird (*Agelaius tricolor*), and large-billed savannah sparrow (*Passerculus sandwichensis rostratus*). More information is available on these species at <http://www.dfg.ca.gov/hcpb/species/species.shtml>.

Several additional species considered extirpated from Ballona Wetlands but not on state or federal special-status lists since they are observed in suitable habitat elsewhere in Southern California may occur following restoration (Cooper 2005b, 2005e).

Special-Status Birds Seen During Migration

Several California Species of Special Concern observed occasionally during migration at Ballona include the long-billed curlew (*Numenius americanus*), primarily observed flying over Area B, Vaux’s swift (*Chaetura vauxi*), willow flycatcher, and yellow warbler (*Dendroica petechia*). Other species observed during migration at Ballona Wetlands, not on any federal or state list of special-status species but considered locally significant by some birders since habitat is limited in the Los Angeles Basin, include the brant (*Branta bernicla*), black-

bellied plover, Bonaparte's gull, royal tern (*Sterna maxima*), and American pipit (*Anthus rufescens*) (Cooper, 2005e).

Special-Status Birds Observed at the Ballona Freshwater Marsh

Several other birds that are California Species of Special Concern have been recently recorded at the Freshwater Marsh. These include the least bittern (*Ixobrychus exilis*), redhead (*Aythya americana*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Several other birds observed at the Freshwater Marsh but not included on any current state or federal lists of special-status species, but considered locally significant by some birders since they are otherwise rare in the Los Angeles Basin, are American bittern (*Botaurus lentiginosus*), white-faced ibis (*Plegadis chihi*), common moorhen (*Gallinula chloropus*), Wilson's phalarope (*Phalaropus tricolor*), western meadowlark, and blue grosbeak (*Guiraca caerulea*) (Cooper, 2005b, 2005e). The western meadowlark and blue grosbeak are also locally significant since the habitats in which they are observed at Ballona Wetlands (dune willows for blue grosbeak; freshwater and saltmarsh for the western meadowlark) are otherwise rare in Los Angeles County (Cooper, 2005e).

5.6 INVASIVE AND NUISANCE SPECIES

Invasive species can adversely affect natural areas that support native ecosystems, including ecological reserves and wildlife areas. This section describes some of the invasive species known to occur within Ballona Wetlands that will need to be considered in the development of restoration and adaptive management plans.

5.6.1 Invasive Plant Species

Developing a restoration and management plan for Ballona Wetlands requires consideration of the extent, impact and growth trend of the non-native plant species on site, as well as a strategy for removing and/or controlling these weed species. Now that development pressures have been removed from Ballona Wetlands, there is probably no greater challenge to the success of the wetland restoration than the issue of non-native plant species. Even without further disturbances, the weedy plant species will most likely continue to alter the wetland in ways that will reduce the value of the site as habitat, not only for native plants, but also for native wildlife.

The presence of non-native species throughout the different habitat types on the site (Appendix B-1) is an indication of past disturbances to the wetland. Many of these weedy plant species are very effective competitors to the native plants, and once established, will not be replaced by natives without active restoration and management.

5.6.1.1 Vegetation

A comprehensive invasive species inventory currently does not exist for the Ballona Wetlands area, although a number of exotic plant species have been identified throughout the project area. Appendix B-1 lists a total

of 171 annual and perennial non-native plant species known from the various habitat types at Ballona Wetlands. While not all of these species are currently a problem for habitat quality, many of these species have become established in enough areas to be currently excluding the native habitats of the wetland.

The non-native plant species at Ballona Wetlands include both perennial and annual weed species. Some of the more problematic perennial species include terracina spurge (*Euphorbia terracina*), Australian saltbush (*Atriplex semibaccata*), pampas grass (*Cortaderia* spp.), Brazilian pepper (*Schinus terebinthifolius*), at least three species of wattle/acacias (*Acacia* spp.), castor bean (*Ricinus communis*), ice plants (*Carpobrotus* spp., *Malephora crocea*, etc.), myoporum (*Myoporum laetum*), giant reed (*Arundo donax*), and fennel (*Foeniculum vulgare*). The wetland also has extensive populations of annual weed species, including Russian thistle (*Salsola tragus*), sweet clovers (*Melilotus* spp.), tocalote (*Centaurea melitensis*), mustards (*Brassica* spp.), brome grass (*Bromus* spp.), ryegrass (*Lolium* spp.) and garland chrysanthemum (*Chrysanthemum coronarium*).

Although it is difficult to quantify whether the perennial or annual weeds are more of a problem across the entire system, it is anticipated that additional detailed information regarding the extent of invasive plant species within the project area will be forthcoming as part of CDFG's vegetation assessment and mapping efforts.

In general, the most serious weed threat to the saltmarsh system (tidal and/or impounded nontidal) comes from the perennial weed species (e.g. *Limonium*, *Atriplex semibaccata*, etc.), which can compete directly with the native perennial species throughout the entire year. Many of these perennial weed species within the wetland are also adapted to a saline environment (e.g. *Mesembryanthemum* spp.), and in many cases the weed species are the superior competitors (Zedler et. al., 1992). Introduced species of 'sea lavender' are increasingly becoming a problem in tidal saltmarsh habitats where few exotic species have been able to invade. These plants of the genus *Limonium* are from European saltmarshes and other habitats of the Mediterranean region and have been introduced through the horticultural trade. *Limonium ramosissimum* is perhaps the most common of these relative recent introduced perennial weeds.

The typical native saltmarsh system is dominated by perennial species; so exotic competitors that are annual species do not always have the same impact as the exotic perennials. The exotic annual species thrive for just a short period of the year, so the competition is limited to the annual life cycle. Remaining dead thatch from these annual weed species can also adversely impact native habitat, especially after multiple seasons of thatch build-up. This thatch build-up can not only hinder the germination of native seedlings, but can also restrict perennial sub-shrubs and shrubs that grow low and spreading. Examples of annual weed species of the upper marsh, especially in zones of fluctuating salinity regimes, include grasses such as *Polypogon monspeliensis*, *Lolium multiflorum*, and *Parapholis incurva*, and Brass-buttons (*Cotula coronopifolia*). Annual iceplants such as *Mesembryanthemum nodiflorum*, concentrate salts and can change the character of habitats by excluding native species in transition areas where the increase in salinity can reach toxic levels.

To date, removal and management efforts for non-native plant species at Ballona Wetlands have focused on removal of iceplant and other herbaceous exotic species in the western dunes portion of Area B; and targeted removal of woody nonnative shrubs in upland areas of Areas A, B, and C.

5.6.2 Invasive Wildlife Species

5.6.2.1 Invertebrates

The Argentine ant (*Iridomyrmex humilis*) has been found to be the most abundant insect in the Ballona Wetlands region (Nagano et al., 1981). During a survey in the early 1980's it was not uncommon to pull a single pitfall trap with over 10,000 individuals in it (Nagano et al., 1981). It is believed that the overwhelming numbers of this introduced species has led to the decline of native ant species, and loss of food resources for horned lizards and other species that depend on native ants. The honey bee (*Apis mellifera*), which was introduced to the U.S. in the middle of the 19th century and is now present nearly everywhere in California, may compete with native bees for flowers (Nagano et al., 1981). One non-insect invertebrate, the invasive African land snail (*Otata lacteal*) was collected in Area C in 1991 (Carter, 1991).

5.6.2.2 Fish

Introduced species of fish found in Area B, Marina Del Rey, and Ballona Creek include mosquitofish, sailfin molly, and yellowfin goby. Mosquitofish were widely introduced in order to control mosquitoes and entered California in 1922 (Swift and Frantz, 1981). This freshwater species has been collected in each survey of Area B from the past 25 years. In 1981 it was one of the two dominant fish in Area B (Swift and Frantz, 1981). In 1991, mosquitofish accounted for 61% of all individuals collected (Soltz, 1991). In 1996 it was the second most abundant species found in Area B and between 2001 and 2004 it was the third most abundant fish in Area B. This species is believed to be detrimental to native fishes (Haglund et al., 1996).

Sailfin molly are an invasive species believed to have been introduced to the area by release from home aquariums. They have been collected during nearly each sampling event since 1991. In 1991 it was the third most abundant fish sampled and the 155 fish accounted for 1.6% of all individuals collected. In 1996 two sailfin mollies were captured. Eight individuals were caught between 2001 and 2004, less than 0.01% of all individuals collected.

Yellowfin goby are native to Japan, Korea, and China and are believed to have been introduced from ballast water. They are predators and can impact native fishes through either predation or competition for limited resources. The species was first found in San Francisco Bay in the 1960's and reached San Diego County in the 1980's (Zedler, 2001). Yellowfin goby were first found in Area B in 1981 and were found in both Area B and Marina Del Rey in 1991. In Area B, one specimen was captured in the fall of 1990, which represented just over 0.1% of the total catch, while three were captured in the spring of 1991. Again, this number represented less than 0.2% of the total capture. In Marina Del Rey, eight yellowfin goby were collected out of 5,469 total fish, 0.15% of the total catch in 1991.

5.6.2.3 Reptiles and Amphibians

Areas A, B, and C were evaluated for amphibians and reptiles most recently by Impact Sciences (1996) and all recorded amphibians and reptiles were found to be native. Earlier studies also found no invasive species of reptile or amphibian (Hovore, 1991; Hayes and Guyer, 1981).

5.6.2.4 Mammals

Non-native mammal species found in Ballona Wetlands include house mouse (*Mus musculus*), black rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), domestic cat (*Felis cattus*), Virginia opossum (*Didelphis virginiana*), domestic dog (*Canis familiaris*), and red fox (*Vulpes vulpes*). In general, in 1981, native and non-native species were about equally abundant. In 1996, only 18% of all captures were native species.

House mice have been observed in each of the Ballona Wetlands areas in which mammal populations have been studied. Impact Sciences (1996) found there had been a substantial increase in the density of the house mouse in the past 15 to 20 years. The 1996 study also concluded that the aggressive house mouse had likely displaced native fauna such as Stephens' vole and native mouse due to its ability to out-compete these species for resources.

Black rat were captured in Areas A and B in 1996. Norway rat were captured in Area B in 1996 and in both Areas A and B in 1981. Impact Sciences (1996) survey found domestic cats in Areas B and C. Virginia opossum were observed in Area B in each survey in 1981, 1991, and 1996. The opossum is typical of urban areas with disturbed open space (Impact Sciences, 1996). They were also observed in Area A in 1996. Dogs were observed in Areas A and B in 1981 and in Areas B and C in 1996.

Red fox were observed in Areas A and B in 1991 and in Area B in 1996. Hovore (1991) found that species diversity had decreased and that the species most vulnerable to fox predation, such as voles and rabbits, were significantly reduced or absent from formerly occupied areas. Loss of diversity within the Ballona Wetlands region can also be attributed to the general degradation of the habitat quality, although it appears that many of the specific declines by taxon may be a direct result of red fox predation (Hovore, 1991). In addition to native small mammals, red fox has also had a substantial affect on populations of ground-nesting birds, amphibians, and reptiles (Impact Sciences, 1996).

5.6.2.5 Birds

Several non-native bird species common to Southern California are found in Ballona Wetlands, including the European starling (*Sturnus vulgaris*) and house sparrow (*Passer domesticus*). Both are species native to Britain that were introduced into the United States during the early- to mid-1900's. Both species take over nesting habitat of native bird species, thereby reducing the populations of native species. For example, the European starling nests in cavities (small holes in trees or other structures) and has been implicated in a nationwide reduction in the populations of western bluebirds (*Sialia mexicana*). Starlings have even been

observed (rarely) preying upon California least tern chicks (Collins, personal communication). The European starling and house sparrow were observed during all KBC surveys on Areas A, B, and C.

Some native bird species that are a problem for other native birds include the American crow, brown-headed cowbird (*Molothrus ater*) and great-tailed grackle. American crows are very well adapted for living in residential areas, and they prey heavily on native bird species. During surveys for Belding's savannah sparrow in Ballona Wetlands, several crows were observed foraging within the pickleweed marsh, likely searching for garbage blown in or washed up during high tides, as well as for eggs of native nesting birds. American crows have been implicated in the lack of California least tern reproductive success in 2004 and 2005 at the 'Venice Beach' nesting site just north of Ballona Creek. The brown-headed cowbird population has expanded with agricultural practices; these birds are nest parasites that locate and remove eggs from nests of native birds, replacing them with their own. The native birds typically do not recognize the foreign eggs and raise the young as if they were their own, thus producing no offspring of their own. At the Freshwater Marsh in 2005, a common yellowthroat was observed feeding a juvenile brown-headed cowbird, but brown-headed cowbirds are otherwise uncommon in migration and throughout the summer at Ballona Wetlands (Cooper, 2005b). Great-tailed grackles have recently colonized Ballona Wetlands and nested at the Freshwater Marsh in 2003 (Cooper, 2005b). Although a species native to the United States, it is a relatively new arrival and has been reported competing for nest sites with red-winged blackbirds (Rutledge and Chandler, 1979) and preying on other birds (Johnson and Peer, 2001).

Non-native, non-bird predators on birds at Ballona Wetlands include feral cats, a widespread problem in many areas of Southern California. However, the predominant non-native predator on birds at Ballona Wetlands and other Southern California coastal wetlands is the red fox, which is very well adapted to human modified habitats and was frequently observed (as were its tracks and scat) during surveys on Areas A and C, but particularly on Area B. The red fox population at Ballona Wetlands is apparently supplemented by red fox at Los Angeles Airport. Red fox have perpetrated substantial reductions in bird reproductive success as well as in populations of special-status bird species (Jurek, 1992). For example, prior to an intensive trapping program during the late 1980's that removed red fox from the Anaheim Bay marsh at the Seal Beach Naval Weapons Station, red fox had extirpated light-footed clapper rails from the area. The clapper rail population at Seal Beach recovered following removal of red fox from the area.